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CONSERVATION OF SPECIES OF WILD FLORA AND VERTEBRATE FAUNA THREATENED IN THE COMMUNITY

PART VII TERRESTRIAL MAMMALS (EXCLUDING BATS): SPECIES REPORTS

by

Jane Thornback

assisted by Martin Jenkins and Jane Gilmour

IUCN Species Conservation Monitoring Unit
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THREATENED MAMMALS

Introduction

Excluding bats and marine species, about 86 wild mammal species live within the EEC boundaries. Of these over a third (31) have their survival in the Community possibly jeopardized. The overriding cause of their predicament is destruction of the habitats on which their existence depends. Such destruction results from human activities that have steadily modified the wilderness of western Europe into a manmade landscape that largely precludes coexistence with wild creatures. The increasing human population has expanded into previously undisturbed areas and has had increasing impact on the environment - building, draining, ploughing, chopping, and polluting. Although human numbers in the Community may now be stabilizing, the impact on the environment continues to grow. Today even the remotest areas are invariably afflicted by the effects of pollution.

Method

The following list of threatened mammals in the EEC is the result of a questionnaire sent to government departments, non-governmental organizations and mammalogists throughout the Community countries. The questionnaire comprised a checklist of all EEC mammals. Correspondents were requested to comment on the status of species inhabiting their respective country. Analaysis of the responses provided a guideline as to which species were possibly threatened on a Community level and therefore which needed further investigation into their status. Additional guidelines were provided by the 1976 Council of Europe's Report 'Threatened Mammals in Europe', the 1978 German Red List of Threatened Species, and the 1978 Nordic Threatened Species List.

The second phase of investigation aimed to discover as much relevant information as possible about the distribution and population of the species that the survey had identified as possibly threatened. This was accomplished by literature searches and additional correspondence with Community mammalogists.

The following list is the result of these inquiries and is divided into two sections: Part 1 is a list of mammals definitely threatened in the Community, and Part 2 is a list of mammals possibly threatened in the Community.

Threats and Species

Apart from habitat loss which has undoubtedly been the major factor in species decline in the EEC, the other threats are pollution, uncontrolled hunting (including poaching), interspecific competition as natural barriers separating species have been broken down, and hybridization. Invariably these threats act in concert to cause the decline of species, but for the five* different mammal orders represented in the EEC, the importance of one or other of these threats is invariably greater than the others and often varies with the Order.
Insectivores, Lagomorphs, Rodents, Carnivores and Artiodactyls all occur in the EEC.

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*A sixth order, Marsupialia, is represented in the Community by two feral populations of Red-necked Wallabies Macropus rufogriseus, which live in the United Kingdom. However since the species is a recent introduction to the EEC it is not considered in this report.

The most threatened group is the Carnivores: The Wolf (*Canis lupus*), Brown Bear (*Ursus arctos*), European Mink (*Mustela lutreola*), Otter (*Lutra lutra*) and Lynx (*Lynx lynx*) are all definitely threatened; the Pine Marten (*Martes martes*), Genet (*Genetta genetta*) and Wild Cat (*Felis silvestris*) are possibly threatened. Carnivores have declined mainly because their predatory habits have continuously brought them into conflict with man. They are feared as dangerous creatures (although largely based on myth), and hated because of predation on domestic livestock and poultry, and on the large herbivores and game birds favoured by the hunting fraternity. The human response has been to eradicate them. Habitat loss has also played a major role since carnivores tend to depend on large home ranges. A likely future threat that is now emerging is indiscrimate control of predators in anti-rabies campaigns.

The threatened Insectivores, Lagomorphs and Rodents tend to be those species whose EEC ranges constitute only the fringes of their main distribution range. For instance, Northern Birch Mouse (*Sicista betulina*) and Root Vole (*Microtus oeconomus*) both have ranges which extend right across Siberia. Others such as the Algerian Hedgehog (*Erinaceus algirus*) and Crested Porcupine (*Hystrix cristata*) are mainly African species whose northern range touches the EEC (they may in fact have been introduced by man a millenium or so ago). The Arctic Hare (*Lepus timidus*) the only Lagomorph in the list, occurs mainly north and east of the EEC limits. These species therefore tend to have small, fragmented distributions in the EEC countries and are mainly at risk from habitat loss, in particular from the intensification of agriculture. (Although the Hare suffers also from hunting pressure).

The threatened Artiodactyls - the Corsican Red Deer (*Cervus elaphus corsicanus*), the three Chamois subspecies included (*Rupicapra rupicapra ornata*, *R. r balcanica*, and *R. r. cartusiana*) and the Mouflon (*Ovis ammon musimon*) declined mainly because of uncontrolled hunting with habitat loss being of little importance.

Species from all Orders which depend upon water e.g. Pyrenean Desman (*Galemys pyrenaicus*), Southern Water Shrew (*Neomys anomalus*), Beaver (*Castor fiber*), Otter, and European Mink have been particularly hit by water pollution and channelisation.

Pesticides are believed to have had a deleterious effect on at least one mammal species. A recent study to determine why the Otter declined in England and Wales concluded that the most probable reason was the use of pesticides, particularly dieldrin in the 1950s; habitat loss then preventing a recovery of the species.

Hybridization affects the Wolf (with domestic dogs), the Wild Cat (with domestic cats) and the Chartreuse Chamois (with the nominate subspecies *Rupicapra rupicapra rupicapra*).

Of the 15 species listed in this report as definitely threatened, only one is endemic to the EEC, and that is already extinct - the Bavarian Pine Vole (*Pitymys bavaricus*). Twelve species are considered endangered or vulnerable and all these except the European Mink and the European Souslik, have at least some conservation measures in operation. The Wolf is the focus of a long-term conservation plan; similarly the Bear, the Corsican Red Deer, and the Lynx (which is being reintroduced to various areas). Such action is having a beneficial effect on these species, which although still severely threatened, at least now have a chance for survival. The lesson being that conservation action can save species.

Recommendations

The most important contribution to the conservation of mammals within the EEC is the implementation of the 1979 Convention on the Conservation of European Wildlife and Natural Habitats. The main objective of the Convention is to improve the conservation of wild fauna and flora not only by controlling exploitation but also by protection of habitats. Contracting parties (which include all ten EEC countries) must also undertake to continuously monitor the status of European Wildlife and the efficiency of the Convention, and adapt the Convention immediately to any change in circumstances. Thus it is a legal tool not only to prevent the extinction of European species, but also to ensure that continuous scientific research is carried out and its results applied to safeguard European Wildlife and Natural Habitats.

Compilation of this report has led to the recognition of various conservation requirements specific to the EEC:

1. Establishment of protective legislation wherever necessary.

2. Coordination of protective legislation throughout the EEC.

   e.g. The need for the Irish Otter population to be totally protected.

3. Enforcement of existing protective legislation.

   e.g. For the Mouflon (Ovis ammon musimon) against poaching.

4. Establishment or extension of national parks or protected areas to conserve critical habitat.

   e.g. an extension of the Abruzzo and Pyrénées National Parks would benefit both the Bear and the Lynx.

5. Control of tourism and human impact on such protected areas.

   e.g. Abruzzo National Park is home for Wolf, Bear, Otter and Chamois. It is therefore of great concern that human pressure on the park is not allowed to become detrimental to these species.

6. To establish rigorous land-use planning regulations that take into account threatened species and their critical habitat. Essentially this should involve an environmental impact assessment of any major development project.

   e.g. The Pyrenean Desman requires unpolluted mountain streams for its survival, but holiday homes built in its range pollute the water and cause soil erosion.

7. Production of conservation plans for species identified as definitely threatened and which as yet do not have such plans; a possible model could be found in the Recovery Team/Recovery Plan approach adopted by the U.S.A.

   e.g. For European Mink.

8. Financial support and recognition of existing conservation plans.

9. Field surveys to determine the status of species where this is inadequately known.

e.g. Much of the threatened or possibly threatened fauna of Greece.

10. Financial support for the above activities.

11. Facilitation of coordination between mammalogists in the EEC for exchange of data, discussion of problems, and recommendations for action. A vehicle for this might be the establishement of a European Mammalogy Society with a conservation committee, along the lines of the Societas Europaea Herpetologica.

List of Mammals *Definitely* Threatened in the EEC.

Species		*Status*
Galemys pyrenaicus	Pyrenean Desman	V
Sciurus anomalus	Persian Squirrel	R
Spermophilus citellus	European Souslik	V
Castor fiber	Beaver	V
Pitymys bavaricus	Bavarian Pine Vole	Ex
Microtus oeconomus	Root Vole	E/V
Sicista betulina	Northern Birch Mouse	R
Canis lupus	Wolf	E/V
Ursus arctos	Brown Bear	E/V
Mustela lutreola	European Mink	E
Lutra lutra	Otter	E/V
Felis lynx	Lynx	E
Cervus elaphus corsicanus	Corsican Red Deer	E
Rupicapra rupicapra ornata	Abruzzo Chamois	V
Rupicapra rupicapra cartusiana	Chartreuse Chamois	E
Rupicapra rupicapra balcanica	Balkan Chamois	V
Ovis ammon musimon	Mediterranean Mouflon	V

List of Mammals Possibly Threatened in the EEC.

Species		Status
Erinaceus algirus	Algerian Hedgehog	K/NT
Neomys anomalus	Southern Water Shrew	K
Crocidura lasia		R/K
Talpa caeca	Mediterranean Mole	K
Lepus timidus	Mountain Hare	V/NT
Cricetus cricetus	Common Hamster	V/NT
Cricetulus migratorius	Grey Hamster	V/K
Spalax leucodon	Lesser Mole Rat	V/K
Acomys minous	Cretan Spiny Mouse	IK
Dryomys nitedula	Forest Dormouse	R/K
Hystrix cristata	Crested Porcupine	V/NT
Martes martes	Pine Marten	V/K
Vormela peregusna	Marbled Polecat	K
Genetta genetta	Genet	K
Felis silvestris	Wild Cat	V/NT
Capra aegagrus	Wild Goat	V/K

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INSECTIVORA: TALPIDAE	Status: EEC	World
Galemys pyrenaicus Geoffroy, 1811	V	V

E. Pyrenean Desman
F. Desman des Pyrénées
G. Pyrenäen-Desman

DISTRIBUTION

EEC: France (1-11).

France: Found along the northern slope of the Pyrénées mainly from 400 m to the top of the mountains (2,3,4). For map see (3).

World: Also occurs in the mountains of north-west Spain and northern Portugal (1,3,6).

HABITAT

Fast flowing mountain streams that are cold, well-oxygenated, rich in invertebrate fauna, constant in flow, and free from pollution (2,3,5,6). Favours open rivers and avoids woody banks. Usually found at altitudes of 400-2250 m, although in the Pays Basque where the water is still unpolluted, the species can be found almost to sea level (e.g. at Saint-Pée-sur-Nivelle, altitude 30 m) (2).

POPULATION

EEC: France: Numbers unknown. The Desman has disappeared particularly from the plains and the foothills (up to 400 m altitude). Numbers fluctuate from year to year but Dr Bernard Richard who has intensively studied the species, reported in August 1982 that after a decline in the 1960s, the population seemed to be increasing (2).

World: Vulnerable (13).

THREATS

Pollution, deforestation, and recently trapping. The Desman cannot tolerate water pollution and this is probably the major cause of its disappearance from the plains and foothills. Upland deforestation is also a threat since it adversely affects the river fauna on which the Desman feeds. The loss of vegetation from the slopes causes soil erosion and destroys the 'sponge-capacity' of the land -- drought or flooding follow since there is no vegetative cover to absorb or store the water. Such large variations in waterflow cause a die-off of the river fauna, as does siltation of the stream beds. River fauna is also killed by runoff from the tarring and salting of mountain roads which are usually sited near rivers (2,3).

Recently there has been increased trapping to provide live specimens of the Desman to collectors; many animals are thought to die in the process (3).

CONSERVATION MEASURES

France: The Desman is completely protected by law under Article 1 of the decree of 25th November 1977 (14) and part of its range occurs in the Parc National des Pyrénées (2). The species has been the subject of several studies; in particular by Dr. Bernard Richard who has studied it since 1965 (3,4,5,9).

Because the Desman has such a restricted range and is so dependent upon well-oxygenated water, it would benefit from any general measures aimed at minimising soil erosion and water pollution. For example, the former would be reduced if a planned upland-forest exploitation programme existed aimed at maintaining vegetative cover, and whereby trees were planted parallel to the hill contours (2). Similarly, the streams the species inhabits should not unnecessarily be harnessed for hydro-electric schemes or irrigation, and should be kept free of pollution.

Local pressure groups in the Pyrenean region have already protested against the construction of holiday homes which pollute the neighbouring streams, and have also contested the building of dams which flood mountain streams. In addition local authorities have been notified of the damaging effects of tarring and salting (2).

The Desman is listed in Appendix 2 of the 1979 Convention on the Conservation of European Wildlife and Natural Habitats. It is therefore designated a 'strictly protected fauna species' and is to be 'specially protected'. Each contracting party (in this case France) is thus required to take appropriate and necessary legislative and administrative measures to ensure the special protection of the Pyrenean Desman. In particular the following are prohibited:

1) all forms of deliberate capture and keeping and deliberate killing;
2) deliberate damage to or destruction of breeding or resting sites;
3) deliberate disturbance, particularly during the period of breeding, rearing and hibernation;
4) possession of, and internal trade in these animals, alive or dead, including stuffed specimens and any readily recognisable part or derivative thereof.

REMARKS

For description of animal see (4,12).

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RODENTIA: SCIURIDAE	Status: EEC	World
Sciurus anomalus Schreber, 1758	R	NT

E. Persian Squirrel
F. Ecureuil du Caucase
G. Kaukasisches Eichhörnchen

DISTRIBUTION

EEC: Greece (1,2,5).

Greece: Confined to the island of Lesbos in the Aegean off the coast of Turkey (1,2,5).

World: Caucasus and Asia Minor south to Palestine and through the Zagros Mountains to Shiraz (2).

HABITAT

Found on Lesbos in bushy and forested areas and olive groves; the species appears more terrestrial and less dependent on trees than the European Red Squirrel *Sciurus vulgaris* (5).

POPULATION

EEC: Greece: In 1982 said to be moderately common on Lesbos, with the population probably stable (5). Antipas in 1982 described its status as 'Indeterminate' (3).

World: Unknown, though unlikely to be threatened.

THREATS

The species may be affected by habitat deterioration and is believed to be shot occasionally, though this is unlikely to have a very deleterious effect on the population (5).

CONSERVATION MEASURES

Greece: Protected by Presidential Decree (No. 67/1980) (4); there are no nature reserves or protected areas on Lesbos (5). It is recommended that the population be monitored so that any steps necessary to maintain the species on Lesbos can be taken.

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RODENTIA: SCIURIDAE	Status:	EEC	World
Spermophilus citellus (Linnaeus, 1766)		V	K

E. European Souslik
F. Spermophile d'Europe
G. Europäische Ziesel

DISTRIBUTION

EEC: Greece (1,2,5,6).

Greece: Found in steppe areas in northern Greece from western Macedonia to Thrace (1,4).

World: Eastern Europe, apparently in three disjunct areas: eastern Austria, south-west Poland and much of Czechoslovakia, through Hungary to western Rumania and north-eastern Yugoslavia; south Ukraine, eastern and southern Rumania, through Bulgaria to European Turkey; southern Yugoslavia and northern Greece. The Souslik in western Asia (Caucasus, Asia Minor south to Palestine) is now generally considered to be a separate species Spermophilus (Citellus) xanthoprymnus, though has been regarded as a distinct subspecies of Spermophilus citellus (6).

HABITAT

Open landscapes, though is not apparently very well adapted to true open steppe, preferring plains with low degraded grassland; the species cannot cope with wet areas and only occurs incidentally on arable and cultivated land, being known, for example, to sporadically visit lucerne fields (4,5,6).

POPULATION

EEC: Greece: Ondrias in 1982 noted that numbers appeared to have been much reduced and that the species was now confined to isolated populations in undisturbed areas, especially old pastures and grassy areas near rivers (4). Antipas in 1982 recorded it as 'Insufficiently Known' (3).

World: Unknown, though in 1980 it was noted that considerable decreases in numbers and the extent of suitable habitat had taken place in the last few decades (6).

THREATS

The Souslik has reportedly been severely affected by the introduction of intensive agricultural techniques in Greece, as elsewhere in its range (4).

CONSERVATION MEASURES

Greece: The species is not protected (4) and is not known to occur in any protected areas. Surveys of distribution and status are needed to enable a conservation plan to be drawn up, which should include the setting aside of areas of suitable habitat where viable populations remain.

REMARKS

The generic name Citellus is often used (6).

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RODENTIA: CASTORIDAE

	Status EEC	World
Castor fiber Linnaeus, 1758	V	NT

E. Beaver
F. Castor
G. Biber

DISTRIBUTION

EEC: France; reintroduced to the Federal Republic of Germany (1-17).

France: Indigenous populations are now confined to the Rhône valley, principally the lower Rhône in the Montélimar to Avignon area but also higher up (3,10,11,13,18). In the upper Rhône basin, Ariagno noted in 1976 that the Beaver had survived precariously on the Rhône itself just south of Vienne (on the Ile de la Chèvre) where it was recorded in 1973, but the subsequent destruction of the riverine vegetation there had probaby caused its disappearance (18). Traces were also found on the Ile Barley between Vienne and Lyon in spring 1973 and January 1974 but it seemed unlikely that a permanent population could have maintained itself following the construction of the Pierre-Bénite Dam in 1966 (18). Upstream of Lyon it still survived in the backwaters and on islands dotting the river between Lyon and the Ain and at the confluence with the Ain, though was expected to disappear in due course because of industrial and recreational development (18). In the affluents of the Rhône the Beaver is more widely and securely distributed (18). It was present in several tributaries on the left bank of the Rhône - the Roubion, the Drôme (to above Saillout), the Galaure and the Dolon on the Varèze (18). The lower tributaries on the right (west) bank of the Rhône also served as important refuges; the Beaver was found throughout the Ardèche, the Céze, the Gardon rivers (Gardon-d'Ales, Gardon-de-Mialet, Gardon-de St. Jean) and their affluents (19). In some of these it ascended sufficiently high to cross over into the Lot and Tarn which drain into the Atlantic although permanent colonies were not known here (19). Its presence on the Saône remains conjectural. Several reintroductions had been carried out above Lyon, since 1971 the departmental Direction d'Agriculture in Haute-Savoie having introduced them to three watercourses: Les Usses, L'Eau-Morte, and the Foron de Sciez, an affluent of Lake Léman (18). The Usses colony had apparently given rise to a small population on the Rhône below the Fiers Dam (1). Individuals from the Rhône basin have been reintroduced elsewhere such as in Haute-Marne (Forêt du Der), Alsace, Brittany, on the Loire (between Blois and Orléans) and unsuccessfully in the Haute Tarn and in Poitou. Reintroductions were reportedly in progress in 1982 in Lorraine, in the Grenoble area and in Bourgogne (19).

The Beaver formerly occurred throughout France and was still present in Lorraine in the mid 16th century and Alsace in the 17th century. By the beginning of the 20th century its distribution was restricted to the Rhône valley. The Beaver has gradually expanded its range northwards in the Rhône basin, though this natural spread may be limited in part by the presence of the Pierre-Bénite and Beaumont-Montheux Dams on the Rhône and Isère, which lack 'contra-canal' drainage systems (see below) (3,11,13,18).

Federal Republic of Germany: Beavers became extinct in the 19th century, the last colonies dying out in the 1880s (5). In the Bavaria they are thought to have become extinct in the 1860s (4). A programme to reintroduce the species in Bavaria was officially launched in 1970 (though several animals had escaped from captivity there in 1967) (5,17). It now occurs in five seperate areas. The most successful colony is on the lower Inn River and is partly located in Austria. Another colony is located near the Danube at Neustadt/Donau; a third was started in 1978 at the confluence of the Rivers Isar and Danube; the fourth is in extensive coniferous forest near Nuremberg, and the fifth, which has proved unsuccessful, was sited at the south end of Lake Ammer (5). A small scale reintroduction was underway in north-western Lower Saxony, comprising six individuals in 1982; this was considered to be of very limited long-term importance as habitat conditions were thought not to allow the development of a good-sized population there (5).

World: Formerly throughout the forested parts of the Palaearctic except for the Mediterranean zone and Japan. Greatly reduced since the 17th and 18th centuries. Apart from France, indigenous populations survive in southern Norway, the German Democratic Republic (Elb river), in parts of European Russia, north-west Siberia and the Altai. Has been extensively reintroduced in west Siberia, European Russia, Finland (on a small scale), Sweden, Switzerland and Germany (1,5,11,12).

HABITAT

Aquatic environs with neighbouring dense woodlands (3,12) preferably of White Willow (Salix alba), Poplars (Populus tremula and P. x canadensis) and other riverine trees (5). It prefers small rivers to large, streams to ponds and lakes, and spends much of its time on dry land (13). The reintroduction area in the lower Inn River consists of a chain of four medium-sized impoundments totalling an area of about 50 sq.km. above hydroelectric dams on the river. The dominant tree species are Alders (Alnus incana and A. glutinosa) and Willows (principally Salix alba). The damming has created vast inland deltas with many islands and small channels beside the main river. These islands are densely covered with stands of willows in all age classes up to 30 years (4). This constitutes ideal Beaver habitat (4). In general the current and thus the river gradient must be very gentle (a slope of less than 5%) (19).

POPULATION

EEC: Unknown.

France: Unknown; an estimate of 5000 given in 1980 (10) is thought to be highly inflated (19), though the population was thought to be relatively healthy and increasing (6). It was estimated at about 40 individuals at the beginning of this century, but had increased to an estimated 300 in 1940 and to between 1000 and 3000 in 1965 (3,11). The threat of its extinction is said to be gradually abating (3).

Federal Republic of Germany: One colony, that of the Inn River was reported in 1982 to be slowly increasing (5). In 1980 it contained about 50 individuals (5). The colony at Neustadt/Donau amounted to about 15 individuals at that time; the other colonies were all of very low numbers (less than 10) having each started with two pairs (5). In these cases reproduction in the wild took place in the first years after release, but high losses through death and dispersal (40%) have kept the initial stocks

too low for the populations to be self sustaining (4). However by 1982 the Lower Inn River colony had received no replenishment for four years but was nevertheless increasing; it was thus considered to be self-supporting (5). Reichholf considers that this area is ultimately capable of supporting a population of several hundred pairs with their progeny and that the optimal habitat, an area of roughly 30 ha in the Ering-Frauenstein reservoir, should theoretically support 30-60 pairs (4).

World: Not threatened, although concern has been expressed that the widespread introduction of the American Beaver (Castor canadensis), as has been carried out in e.g. Russia, Poland, Yugoslavia and Finland, could pose a long-term threat through ecological displacement of the native species (13).

THREATS

The main cause of the decline was overhunting for its valuable fur, and for castoreum (used in folk medicine) and habitat destruction (3,4,11,12,13,18). The latter is now of considerable importance, though illegal killing and disturbance still take place (7,18).

France: Although the large-scale management of the Rhône by the Compagnie Nationale du Rhône has had a dramatic effect on the ecology of the main river and has certainly affected the Beaver population there, Richard has pointed out that most of the Beaver population inhabit minor watercourses, the Rhône itself never having been a favoured habitat (other than in its creeks and inlets) (19). He considers that factors affecting these, and direct persecution (still frequent) are of principal importance at present (19). Stream management tends to have a deleterious effect: straightening and levelling of the channel can, in streams with a weak current, lead to a water depth too shallow for Beavers (less than 0.5 to 0.7 m); in those with stronger current, increased turbulence can prevent the construction of lodges. Additionally, banks are invariably steepened and the shallow inclines used as feeding areas disappear. Clearing of banks destroys the Beavers' food source, tending to lead to the development of pioneer vegetation stands dominated by wild Rose (Rosa), plants no dietary value. Often intensive fruit monoculture is carried out right up to the stream edge and Beavers, deprived of their natural food source, turn to fruit trees, causing damage and facing retribution from farmers (see also below) (6,7,13). On the Rhône itself, the Compagnie Nationale du Rhône aims to produce 310 km of fully canalized navigable water, to generate power and to use water for agricultural purposes. To this end, 12 interconnected complexes are being constructed (7). The principal components of these - the main channel and inflow and outflow canals - are virtually sterile and are entirely unsuitable for Beavers; however, the minor channel (original bed) of the Rhône and the 'contra-canal' drainage ditches can provide good Beaver habitat as long as the woody vegetation along the banks and the aquatic vegetation are suitable (7). Water level fluctuations in the 'contra-canals' rarely exceed one metre and have little deleterious effect on the population. The old channel of the Rhône, which now carries only a fraction of the original water load, would provide near-ideal conditions, wth dense bank vegetation and areas of little or no water turbidity but is subject to sudden and considerable changes in water level due to the requirements of the hydroelectric complexes; this can have a severely limiting effect on the Beaver population there (7). It is noted that despite the massive industralization programme of the past twenty years, the Beaver population has in fact considerably increased in this

time and Richard considers that the contra-canal system has even allowed the species to expand its range on the Rhône (14).

Federal Republic of Germany: In 1980 Reichholf reported no immediate threat to the founder populations either by direct persecution or disturbance (5). The original collapse of the population here was also associated with the major river alteration and canalization schemes of the last century. These led to greatly increased fluctuations in water level, causing on the one hand unprecedented flooding and on the other falls in water level due to severe erosion of the canalized river beds, a process leading to the separation of the riverine woodland from the river for much of the year and thus depriving the Beavers of their vital food source. This caused the breakdown and fragmention of Beaver populations, leaving stocks very vulnerable to continued persecution (principally for castoreum but also for fur). The final collapse of the population occurred very rapidly, leaving no time for any protective measures (5).

CONSERVATION MEASURES

Outside the Rhône valley, the principal conservation measure for Beavers in the EEC is reintroduction to suitable sites. Reichhoff makes the following recommendations regarding such sites: a) The carrying capacity of the available habitat should provide suitable conditions for at least 10 pairs of Beavers at each local site; b) the site should contain at least 20 ha of well-grown willow woodland with 6 to 20 km of effective bank length; c) the trial should be started with at least 20 (optimally 50) individuals within a short time span of two or three years d) in total, a minimum population of some 100 pairs should be sustained in adjacent areas which are close enough for dispersal processes (4,5). Socio-economic and political considerations have also to be dealt with (see below).

France: The species was entirely protected throughout France in 1972, hunting having been banned in 1909, and has been protected in the Départements of Bouches-du-Rhône, Vaucluse and Ardèche since 1905 (3,11). Richard has noted that the increase in the Beaver population over the last few decades has been largely brought about by the activities of numerous enthusiasts who have sought to increase public knowledge and appreciation of the Beaver and to help riverside farmers minimize the damage caused by them without having to resort to killing the animals (19). To this latter effect, research on chemical, mechanical and biological methods of controlling damage has been carried out for several years and the results of this have been disseminated to the riverains in pamphlets and other publications (19,20). It has been recommended that in areas of fruit cultivation a band of natural stream-bank vegetation 10-20 m wide should be left to minimize damage by the Beaver to fruit trees and thus save it from persecution as a pest (7). On the Rhône itself, the importance of maintaining the contra-canals and old watercourse of the Rhône with adequate woodland cover has been stressed as these allow dispersal along the river and prevent fragmentation of the population (7). The Beavers themselves do not interfere with the efficient functioning of the river complexes and can be relatively easily accommodated (7). Gravel workings can also become good Beaver habitats at the end of their commercial life, as long as adequate food is present in the form of suitable woody vegetation (i.e. primarily Salicaceous trees) along the banks, and there are watercourses

which allow the emigration and dispersion of offspring (7). There exists in France a society for the protection of the Beaver (11).

Federal Republic of Germany: Completely protected by law (5). Much of the area inhabited by the founder Beaver population in the Lower Inn River lies within an extensive state-owned Conservation Area (5). Reichholf reports that the reintroduction scheme which began in 1970 has generally received popular support, however recently several Beavers have established territories outside the Conservation Area and have felled trees of commercial value. Although the land-owners have pushed for financial compensation the law at present only awards against damage by ungulates. It is possible therefore that local public sympathy for Beaver reintroductions might change and Reichholf urges that funds should be made available to financially compensate against severe damage of valuable timber or garden trees (5).

The Beaver is listed in Appendix 3 of the 1979 Convention on the Conservation of European Wildlife and Natural Habitats, it is therefore to be protected, although exploitation is possible if the population level permits.

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RODENTIA: MURIDAE	Status: EEC	World
Pitymys bavaricus Koenig, 1962	Ex	Ex

E. Bavarian Pine Vole
F. Campagnol Bavarois
G. Bayerisches-Kleinwühlmaus

DISTRIBUTION

EEC: Federal Republic of Germany (1,2,8).

Federal Republic of Germany: Known for certain from only one locality at 730 metres altitude in a valley near Garmisch-Partenkirchen in the Bavarian Alps (1,2). A possibility exists that the species does occur at a second nearby locality but this remains unconfirmed (4,5,8).

World: Nowhere else; endemic to the Federal Republic of Germany (1).

HABITAT

Montane (1,2,8).

POPULATION

EEC: Federal Republic of Germany: Possibly extinct (3,4,8). Known for certain only from its type locality which has now been built over (4). The species will be listed in the forthcoming revision of the German Red Data Book (5).

World: Possibly extinct.

THREATS

Habitat destruction - the site where Bavarian Pine Voles were originally caught has been built over and since then no further individuals have been located, although searches have been conducted (4).

CONSERVATION MEASURES

Federal Republic of Germany: Protected by law (BArtSchV) of the 25th August, 1980. If any individuals of this species are found, their habitat should be given immediate protection.

REMARKS

This species is scarcely distinguishable from P. subterraneus, the European Pine Vole, which is common and widespread. Pitymys is sometimes placed in the family Cricetidae (1), though this is often (as here) considered a subfamily (Cricetinae) of the family Muridae (7).

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RODENTIA: MURIDAE	Status:	EEC	World
Microtus oeconomus (Pallas, 1776)		E/V	NT

E. Root Vole or Tundra Vole
F. Campagnol Nordique
G. Nordische Wühlmaus or Sumpfmaus

DISTRIBUTION

EEC: The Netherlands (1,2,3,4,5,6,7,8,24), and the Federal Republic of Germany (9,10,11,12,23), where it survives in relict populations.

The Netherlands: A field survey of the distribution of the Root Vole in the Netherlands was conducted by A. van Wijngaarden between 1957-1967 (5,6). Root Voles were found to occur in four areas: a) on some islands in the south-west, e.g. Noord-Beveland, Schouwen-Duiveland, Goeree-Overflakkee and Voorne-Putten; b) in the western broads (scattered populations); c) on the island of Texel; d) along the broads and lakes in the Province of Friesland. Van Wijngaarden noted that these areas of distribution were shrinking rapidly (2,5,6,8). By 1979 Microtus arvalis had replaced M. oeconomus on the island of Noord-Beveland (13), and in the Biesbosch (a former fresh-water tidal area) the Root Vole had been replaced by M. agrestis (14). In summary, Van Wijngaarden described the 1980 distribution (excluding the Texel population) as that of widely scattered, isolated small populations (14).

Federal Republic of Germany: By the 1980s was found only in parts of West Berlin (9,10,11,12); last record elsewhere in the country was 1926 (9,15,16).

World: The Root Vole occurs throughout the tundra and taiga zones of the northern Palaearctic from Scandinavia to N.E. Siberia and south to the Ukraine, extreme north-east Kazakhstan, and Shaanxi (1). Southern isolates occur in Hungary, Czechoslovakia, Austria, the Kirghiz Mountains and Tsaidam, as well as in the Netherlands. It also occurs in Alaska and adjacent parts of Canada (1,4,17,18).

HABITAT

Grassy vegetations with a tendency towards wet habitats, particularly if there is competition from other Vole species. Occurs in a wide range of this habitat type e.g. salt marshes, broads, moors, meadows, taiga and tundra (1,2,3,4,5,6,8,24).

POPULATION

EEC: Total numbers unknown but considered to be declining in most of its EEC range.

The Netherlands: No information exists on numbers. However in 1982 de Ridder who has studied the taxon reported it to have been declining for a long time (24), and in 1980 Van Wijngaarden described it as 'Endangered', with numbers decreasing rapidly and there being little hope of survival in the long term (14). Even back in 1965 Van Wijngaarden and Zimmermann were reporting M. oeconomus to be endangered in the Netherlands (8). Van Bree, the Directie Faunabeheer and the Working Group on Mammal

Recording also consider the Root Vole as threatened in the Netherlands in 1980 -- in the 'Vulnerable' category (19,20,21).

Federal Republic of Germany: Still occurs in West Berlin (11). Listed in the German Red Data Book (1977) as endangered with extinction (10).

World: The Root Vole has a very large distribution and is generally common throughout. The populations in the Netherlands are relict groups at the extreme western edge of the species range (2,8,9).

THREATS

The Netherlands: The main threat to the Root Vole has been, and is, habitat destruction caused by changes in land use e.g. introduction of intensive agricultural methods, reclamation of land, increase in recreational facilities, and loss of land to urban and industrial development (2,8,14,24).

In addition, Root Voles are suffering from competition with other Microtus spp such as M. arvalis and M. agrestis which have recently managed to invade Root Vole habitats because of human interference (2,8,13,14). For instance, in the 1950s M. oeconomus was the only Microtus found on the island of Noord-Beveland. In 1960 the island was connnected to the mainland by two dams, and in 1967 M. arvalis invaded the island and gradually replaced M. oeconomus. The situation was monitored closely and by 1979 only four remnant Root Vole populations could be found and it was likely that these would soon disappear (7,8,13,14,24). Similarly in the Biesbosch, Root Voles were replaced by M. agrestis after the construction of the Haringvliet-dam which eliminated tidal effects (14).

Federal Republic of Germany: The extinction of the species (except in West Berlin) was possibly a 'natural' event, but it is also possible that drainage of wetlands contributed to its eradication (9,15,16).

CONSERVATION MEASURES

The Netherlands: Protected by law since 1979 (24) but since the Root Vole is not trapped and is usually not recognised by the lay-man, legal protection gives little advantage. Some small reserves have been established for the species (24). However the reserve on Noord-Beveland has been heavily grazed to make it suitable for waders, as a consequence Root Voles have disappeared (14). In 1976 Smit and Van Wijngaarden proposed that enlargement of existing reserves was urgently needed (14). Such a measure is still necessary and in particular the Texel population should be protected since this is the largest remaining population and is still isolated from the effects of competition with other Microtus spp.

Federal Republic of Germany: Protected by law (BArtSchV) of the 25th August 1980. The species presence in West Berlin should be continuously monitored and when necessary measures taken to ensure the Vole's persistence.

Microtus oeconomus is listed in Appendix 3 of the 1979 Convention on the Conservation of European Wildlife and Natural Habitats, it is therefore to be protected, although a certain exploitation is possible if the population level permits.

REMARKS

M. ratticeps is sometimes used as a synonym of M. oeconomus (4). Microtus is sometimes placed in the family Cricetidae (1), though this is often considered a subfamily (Cricetinae) of the Muridae (22).

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RODENTIA: ZAPODIDAE	Status: EEC	World
Sicista betulina (Pallas, 1779)	R	NT

E. Northern Birch Mouse,
F. Siciste des Bouleaux
G. Waldbirkenmaus

DISTRIBUTION

EEC: Denmark; Federal Republic of Germany (1,2,3,4,5,6,7,8,17).

Denmark: Recorded only in Jylland with several recent records from different parts of Thy in north-west Jylland but only a few scattered records elsewhere (9,16).

Federal Republic of Germany: Little recent information; reported from Schleswig in the north where it was first recorded in 1933 (7,14,15), and in the extreme east where in 1951 Kahmann and Wachtendorf recorded its occurrence in Altreichenau and Waldkirchen in Nieder-Bayern and at Waldmunchen in Oberpfalz, these all being to the east of the Ilz and Regen Valleys in the Bayerisch-Böhmischen Forest (7). They considered that it was likely to be more widely distributed than these few records implied, possibly being also found in the Fichtelgebirge (7). Although there have been no recent records, the species is still expected to occur in these areas (13).

World: Boreal and montane forest zone from Norway and Denmark to the Ussuri region of south-east Siberia, but range very fragmented. North to the Arctic Circle at the White Sea, but not found east of the Yenesei except around Lake Baikal and again in the Ussuri region. South to Austria, the Carpathians, Caucasus and Sayan Mountains (1,17).

HABITAT

In Denmark has been caught in woodland with scrub undergrowth, in marshes with scrub thickets, and in the past this slow-moving species could be caught by hand in cornfields in the autumn when the harvest was gathered. Today, the use of combine-harvesters means that Mice are rarely seen or captured (9). In Bavaria was recorded in woodland predominantly of Beech (Fagus) with some Pine (Pinus) and Spruce (Picea); the area was characterized by moist, acidic soil of high nutritive content and glades with vegetation cover ranging from open to dense, including areas of meadow mown in summer (7).

POPULATION

EEC: Total numbers unknown, though occupies a very small range within the EEC and is thus the subject of concern.

Denmark: No estimate of numbers or trend, but no drastic change in distribution or density is thought to have occurred in recent years (9). Listed as 'Rare' in Denmark in the 1978 Nordic Red Data Book (4).

Federal Republic of Germany: No information on numbers or trends. The German Red Data Book published in 1977 lists it as 'threatened with extinction' (3), and various authorities regard it as 'Endangered'

(10,11,12) or 'Rare' (13), though Kahmann and Wachtendorf noted that it was very likely to be overlooked and might thus be more widespread than generally thought (7).

World: Unknown but very unlikely to be threatened.

THREATS

Specific threats unknown, but in Denmark a change in land use towards more intensive agriculture and silviculture may have caused, and probably will cause, a reduction in the amount of suitable habitat (9).

CONSERVATION MEASURES

Denmark: Specifically protected by law (9,16). Does not occur in any reserve, and apart from a hibernation study under seminatural conditions has not been the subject of a scientific study (9). Care should be taken that areas where this Mouse occurs are not subject to habitat loss or change.

Federal Republic of Germany: Specifically protected by law (BArtSchV) of the 25th August 1980. The species may be expected to occur in the Bayerischer Wald National Park though this is unconfirmed (13). Information is needed on its present distribution.

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CARNIVORA: CANIDAE	Status:	EEC	World
Canis lupus Linnaeus, 1758		E/V	V

E. Wolf
F. Loup Commun
G. Wolf

DISTRIBUTION

EEC: Italy (1-8) and Greece (2,3,5,8,21,22,23).

Occasionally south-west France receives wandering animals from Spain (3).

Italy: Restricted to the central and southern part of the Apennine Mountains where resident in about ten distinct areas, each area corresponding to a different mountain group and seperated from others by deep valleys with high human population densities. Between these areas there is continuous exchange of animals. The total range is about 11,000 sq. km; many other areas are temporarily inhabited for limited periods (1,4,10). The Apennine range potentially suitable covers about 70,000 sq. km.

During the present century the Wolf has been exterminated from the northern Apennines, the Italian Alps and Sicily (4,7); it never occurred in Sardinia (7).

Greece: In 1982 the Wolf was described as being widely distributed on the mainland but to not occur in the Pelopennese. It was known to exist in mountainous areas in Epirus, Macedonia, Thrace, Thessalia, and the northern part of Sterea Hellas (formerly also the southern part). Within this range the species is now mainly isolated into distinct groups(21); it is believed to occupy 60% of its former range (22).

World: Eurasia and North America. At one time the Wolf had an extensive range throughout the Northern Hemisphere north of 20°N latitude, except in deserts and on high mountain tops (4). Several centuries ago Wolves occurred throughout Europe including Britain and Ireland.

HABITAT

In Greece, Wolves occur mainly in mountainous areas (21). In Italy the habitat is almost exclusively apennine: between 800-1500 m in areas covered by large Beech (Fagus) forest broken by extensive pasture land used for cattle and sheep grazing. Two areas are different -- Monti della Tolfa, 50 km north of Rome, and southern Tuscany -- which have mountains less than 600 m covered by typical Mediterranean bush (1,10). Wolves in Italy feed mainly on domestic animals and rubbish from village dumps (1).

POPULATION

EEC: Population estimate in 1982 was of more than 600 Wolves in the EEC.

Italy: The last census, in 1973, indicated a total of about 100 animals (1,4,9,11). A census has not been carried out since but all information concerning sightings, killings of Wolves and /or domestic cattle, and the

data generated by a research programme have led to the conclusion that Wolf numbers are relatively stable (1,9,10); the revised total is of 100-150 Wolves in Italy in 1982 (20). Locally there is a pattern of irregular fluctuations linked to continuous changes in range (1,9,10).

Greece: As of 1982 the total population was unknown since no census had ever been carried out (21); the IUCN/SSC Wolf Specialist Group did however venture a guessestimate of more than 500 Wolves in Greece with the population being either viable or in a phase of steep decline (22). Ondrias reported the species to be most abundant in Macedonia and Thrace (21). Annual bounty totals from 1969 to 1978 averaged just under 800 with no discernible trend apparent (23), however some Wolf experts believe that many of these bounties are dogs.

World: Numbers unknown, but has disappeared from much of its former range and is considered 'Vulnerable' worldwide (12).

THREATS

The Wolf has always been feared as a predator of man (although largely based on myth), and hated because of its predation on domestic livestock, and on large wild herbivores favoured by the hunting fraternity. The human response has been to eradicate the species (1,6,8,13,14). Over the past few centuries it has been exterminated from all EEC countries except Italy and Greece where it is now threatened by habitat loss, prey extermination, hunting (9), and competition from, and hybridization with, stray and feral dogs (30).

Italy: The natural wild prey of the Wolf e.g. deer, have greatly declined and its main prey is now domestic livestock (9). This results in direct conflict with sheep and cattle owners(1), although paradoxically it is not they who kill the Wolves (1). The poaching is done mainly by hunters (1) and in Italy about two million people are hunters. The frequency of casual encounters between man and Wolf is therefore quite high, and is increased by organized fox and boar hunts. Although the Wolf is protected by law most hunters will not refrain from shooting one if encountered (1); about 70% of Wolves die in this way. With few exceptions these hunters are totally unassociated with the shepherds and cattle men who suffer Wolf damage.

Road accidents, the illegal use of poison (directed at foxes but kills Wolves also) and the occasional taking of cubs from dens all serve to decrease Wolf numbers (1).

A more insidious effect is habitat loss and disturbance as humans encroach into once remote areas (1).

Hybridization with domestic and feral dogs, and competition with them for food and range is increasingly a problem as Wolf populations live in closer and closer proximity to man and his pets, and become more isolated from other Wolf groups. Indeed this may now pose the greatest threat to the species in Italy. In Wolf areas, per 100 sq. km there is on average one Wolf, 150-310 free-ranging dogs and 24-82 feral dogs (20).
In 1977 rabies spread into Italy from Austria and has since moved into some Alpine areas. Rabies is such a serious problem that public opinion will probably call for drastic action and will involve an intensive campaign to eliminate stray and feral dogs, such a measure will undoubtedly pose an extreme danger to the survival of the Wolf (20).

Greece: In 1982 the main threat was hunting for its valuable fur (21). It is also killed as a 'pest' because of damage to livestock (21,24); for example a recent strychnine campaign against predators in the Delta of Evros - formerly a 'good' Wolf area - eradicated the species (24). In recent years a small 'safari' industry is reported to have developed to hunt Wolves (legal during the open season) and Bears, *Ursus arctos*, (illegal at all times) (24).

CONSERVATION MEASURES

Continuing protection against hunting is of major importance, as are measures to alleviate the Wolf/dog problem.

Italy: The Wolf is protected by various laws throughout Italy. Since November 22 1976, a ministerial decree of the Agriculture Ministry has protected the species 'in eternum'. The same decree bans the use of poisoned bait (15). Following another national law controlling hunting, approved by Parliament in December 1977, the Wolf is considered a totally protected species. As a consequence of these laws, many regions have approved laws which, as well as confirming the protection status of the Wolf, allow compensation for damages caused by them; Abruzzo, Lazio, Campania, Basilicata and Molise all have these laws, although they do not all work effectively; insufficient appropriation and objective difficulty in ascertaining the damages seriously hinder the uniform application of the law (1).

In 1973 the Italian World Wildlife Fund initiated a project to find out the number and distribution of the last Italian Wolves and in 1974 a joint international IUCN/WWF project began. The latter was divided into three subprojects:

1) Research on ecology and behaviour of the Wolf in Abruzzo National Park.
2) Herbivore reintroduction. e.g. Red Deer (*Cervus elaphus*) into Abruzzo National Park.
3) A public relations, educational campaign promoting the Wolf.

This work, carried out by Dr Luigi Boitani and Dr Erik Zimen has been published (1,4,11,13,16,18,19), and the results have been used by Boitani (with Fabbri) to produce a conservation management plan. The plan centres on the theory that an absolute protection law is insufficient to ensure the conservation of the Wolf in Italy and work must focus on reducing the man-Wolf conflict to an acceptable minimum. This minimum damage level would then be eligible for compensation (1). Boitani proposes a zonation plan -- core areas where the Wolf is fully protected and which can be used as refuge areas, and buffer zones where the Wolf may be hunted (possibly only by foresters and gamekeepers). In all areas not included in these two zones it should be possible to kill Wolves, and no compensation would be paid for damages (1). The plan is based on nearly a decade of work and every effort should be made to support it.

Work is also being carried out to determine how to control and eliminate dogs without harming Wolves (20).

The Wolf occurs in one national park -- the Abruzzo National Park (1), and also in many forest reserves; all hunting is banned in such reserves (10).

An Italian Wolf Group has been established and met in May 1982.

Greece: The Wolf is partially protected being subject to a closed hunting season, although poaching does occur. In cases of severe livestock damage permission may be given to kill an animal outside the closed season. It occurs in the following national parks: Valia Calda N.P. (12,935 ha) in the Perivoli-Grenon region of the Pindos Range, Lake Prespa (4650 ha in the Florina-Nomos region on the Albanian and Yugoslavia borders in Macedonia, Vikos/Aoos Gorge (3300 ha with a 12,255 peripheral zone in Epirus, Mount Olympos (3998 ha in Thessalia and Macedonia), Paranesti-Dramas (450 ha in Drama Prefecture in Macedonia), Mount Oeta (3010 ha with a 4200 ha peripheral zone in Sterea Hellas, and Mount Parnassus (3513 ha in Sterea Hellas). The taxonomic and geographic distribution in Greece is being studied at the University of Patras (21).
The IUCN/SSC Wolf Specialist Group have made the following recommendations for conservation in Greece: a survey, the development of a research and management plan, and an education project (22).

The Wolf is listed in Appendix 2 of the 1979 Convention on the Conservation of European Wildlife and Natural Habitats. It is therefore designated a 'strictly protected fauna species' and is to be 'specially protected'. Each contracting party (in this case Italy and Greece) is thus required to take appropriate and necessary legislative and administrative measures to ensure the special protection of the Wolf. In particular the following are prohibited: 1) all forms of deliberate capture and keeping and deliberate killing; 2) deliberate damage to or destruction of breeding or resting sites; 3) deliberate disturbance, particularly during the period of breeding, rearing and hibernation; 4) possession of, and internal trade in these animals alive or dead, including stuffed specimens and any readily recognisable part or derivative thereof.

The Wolf is also listed in Appendix 2 of the 1973 Convention on International Trade in Endangered Species of Wild Fauna and Flora, trade in it or its products between acceding nations being subject to regulation and monitoring.

REMARKS

On 28 January 1976 nine Wolves escaped from their enclosure in the National Park of the Bayerischer Wald in Germany. All of them had been born in the enclosure between 1973 and 1974. By January 1977 all had been killed (14).

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CARNIVORA: URSIDAE	Status:	EEC	World
Ursus arctos Linnaeus, 1758		E/V	NT

E. Brown Bear
F. Ours brun
G. Braunbär

DISTRIBUTION

EEC: France, Italy and Greece (1-14,30,31).

France: Now survives only in the Pyrénées, where in 1982 it was reported to occur in just two relict populations - in the central part of the Pyrénées (Depts. of Ht. Garonne and Ariège), and in the western Pyrénées in the Vallée d'Aspe, Ossau, and Barretous (Dept. of Pyrénées Atlantiques) (25,26,27), and the Hte. Soule in the eastern part of the Pays Basque. During this century the range of the Bear has contracted greatly, especially in the Dept. of Hte. Pyrénées. At one time the species occurred throughout much of France but as a result of persecution and habitat loss gradually retreated to the Alps and Pyrénées. Animals still occurred in the Alps until recently, the last two were captured in 1919 and 1921, and the last reported Bear sighting was in the Vercors (Isère) in 1937 (5,6,12,21). For map see (5,6,22).

Italy: Bears still exist in three separate localities: 1) the Abruzzo National Park and surrounding areas in the Apennines; 2) in the Province of Trentino in the Italian Alps, principally in an area of 100 to 200 sq. km in the north-eastern part of the Brenta Mountains but with sightings scattered over an area of about 1600 sq. km; and 3) in the area of Tarvisio in the Italy-Austria-Yugoslavia border region (4,8,9,12, 13,14,15,16, 8,20,21,30,31). Bears were once widely distributed throughout the forested zones of Italy, extending southwards into Sicily. By 1500 they had been exterminated from most of the country. Significant populations then only existed in the Alps and in south-central Italy in the Apennine Mountains of Molise and Abruzzi. By the 1930s deforestation and hunting had reduced the populations to small remnants (4,12). For map see (30).

Greece: Bears occur in the Pindhos Mountains in the border region between Epiros, Thessalia and Macedonia (2,3,23), further north near Florina in Macedonia, and in the Rhodope Mountains (near Drama) in Thrace and Macedonia (2,23).

World: Eurasia and North America. Formerly the Brown Bear inhabited all the forest areas of the Palaearctic region, except the southern Japanese islands, but including the Himalayas and S.E. Tibet; and western North America south in the Rockies to New Mexico. Now extinct in the British Isles, much of W. Europe, in N. Africa, and much of the USA; and elsewhere the range is probably much more fragmented than formerly. The species, Ursus arctos, is now generally considered to also include the Grizzly Bears of N. America (1).

HABITAT

Wooded mountainous areas (3,5,21,26). The Brown Bear once inhabited almost the entire coniferous, mixed and deciduous forest zones of Europe. Although outside Europe it seasonally visits the tundras and

arctic heaths above the timberline, it has never in Europe been a true inhabitant of treeless habitats (3).

POPULATION

EEC: A total of about 100-135 in 1982 in Italy and France (7,8,15,17), plus at least 25-30 in Greece if not many more (3,17).

France: The estimate given at the 3rd International Theriological Congress in August 1982 by Berducou and Camarra who have both studied the species in the wild was of a total of about 20 Bears surviving in the Pyrénées, comprised of about 15 in the Pyrénées Atlantiques (censused in 1981 and 1982), and about five in the Ht. Garonne and Ariège (25,26,27).

In the 1940s the number was estimated at about 70, of which about 50 occurred in the Pyrénées Atlantiques, (about 19 in the Vallée d'Aspe and 15 in the Vallée Ossau). In the 1920s the number in the Pyrénées Atlantiques was about 100 (6,12).

Italy: 1980-82 estimated total of 85-115 (15,17,29,31). The Abruzzo population consists of about 75-100 Bears and is relatively stable (2,7,16,29,31), having not changed over the previous decade (4,9,18,30,31). The 1980-82 estimate for Trentino was 10-15 with relatively little change during the 1970s, though there are possible indications of a slight increase (7,8,10,15,21). In Tarvisio there were frequent sightings during the 1970s (15,16) and in 1982 a group of at least three Bears were believed to live in the region (18).

Greece: In 1982 the Bear was reported to be probably 'Vulnerable' (24). Numbers are unknown; some authorities believe there may be several hundred (33), although the estimate for Greece given at the 1979 European Brown Bear Conference was 25-30 (17). If this low figure in fact represents the total population then it indicates a dramatic decrease since the 1950s and 1960s. In 1954 Couturier put the numbers at about 115 (12). However Curry-Lindahl writing in 1970 thought this had perhaps been an underestimate since Hainard (1961) had reported 400 Bears in Macedonia alone (3).

World: Unknown. Losing habitat and declining in numbers in many areas of its range (3,19).

THREATS

The decline of the European Brown Bear resulted from the destruction of its forest habitat, and heavy hunting pressure either for sport or because the Bear was considered a danger to domestic stock (2,3,4,6,12,13). Today the main threats to the species are poaching, habitat loss and disturbance caused by increasing human presence, particularly tourism and especially the building of ski resorts in once isolated mountainous areas; road building, home construction and forestry also contribute.

France: The main threat to the existing small Pyrenean Bear population is poaching, with logging the second most serious threat (26).

Italy: Recent evidence indicates that the Bear population of Abruzzo is scattering over a wider area than previously and that Bears are settling in areas where they have little protection, indeed Zunino cited five Bears killed in 1981/82 as a result (a further three were killed by trains).

Zunino believes that the increasing number of tourists visiting the park and its surrounds greatly disturbs the Bears and forces them to wander in search of undisturbed areas (31). Lovari mentions the possibility of competition from the increasing population of Wild Boar (Sus scrofa) as a factor causing the scattering (29). In Trentino the main threat comes from the construction of logging roads up the once secluded slopes of small valleys - an undisturbed area favoured by Bears. The logging roads increase access by tourists and local people and the disturbance forces the Bears to leave (15).

Greece: Documentation concerning specific threats to the Bear population has not been located, although mention has been made of a small safari industry recently created to shoot Bears (illegal at all times) and Wolves (33).

CONSERVATION MEASURES

France: Totally protected by law since 1962, any damage caused by Bears is indemnified (6). The Pyrénées National Park is only on the extreme periphery of the Bears range and the possibility of extending the park to include all areas occupied by the Bears should be examined (2,5.21), although Camarra believes that such an extension would be very difficult to achieve (25). A working group consisting of the Direction de la Protection de la Nature, the Office National de la Chasse, the Office National des Forêts, and the Fédérations des Chasseurs has been established and has prepared a conservation plan for the Bear. Apart from biological studies it has recommended the need for faster compensation to shepherds (which by 1981 was taking place (25)), a plan to control forestry traffic, and a public awareness programme (to be initiated in late 1982 (25)) (6). Various field studies were ongoing as of 1982, notably ecological studies by Jean-Jacques Camarra (26), and demographic studies by the working group (25). Feeding studies were conducted by Claude Berducou from 1978 to 1980 (27). The survival of Bears in the French Pyrénées is very precarious and every effort should be made to put successful conservation measures into operation.

Italy: Totally protected by law since 1939 (4,30). The Abruzzo population is centred mainly in the Abruzzo National Park established in 1923 and now covering about 42,000 ha (4,30,31). However only about 400 sq. km. of the Brown Bears primary range, covering about 800 sq. km. occurs within the Park boundaries (31). A study of the Abruzzo Bears was begun in 1970 by Zunino and Herrero and resulted in detailed proposals for the species management and conservation. These principally entail extending the Park boundaries, since a considerable proportion of the habitats vital to the Bears are outside the present Park and not fully protected; severely limiting human activities including tourism in various critical refugia within the Park; development of a detailed zoning system; and indemnification in kind for livestock and crop loss, as opposed to the present system of financial compensation (4,9,18,30,31).

The recent scattering of the Bear population from the national park has resulted in two other important areas in Abruzzo now having Bears. These, the Sirente Mountain and the Majella Mountain are both proposed nature parks. On Majella the Bears have occupied a 2430 ha State Nature Reserve (Valle dell'Orfento) which borders with the 1563 ha Feudo Ugni State Nature Reserve and with the proposed 3000 ha nature reserve of Vallone Fara (18).

Studies of the species in Abruzzo have been ongoing since the early 1970s (4,9,30,31). Studies and protective measures have also been enacted in the autonomous Province of Trentino since the early 1970s and the Bear has been especially protected by the Provincial law of 10th August 1978 No. 31. Since 1976 the Trentino authorities have enacted a programme of environmental education, compensation for Bear damage, and survey and ecological studies; the latter by Hans Roth (32). Further measures are aimed at limiting forestry practices, limiting the construction of more forestry roads, and prohibiting building construction in vital Bear areas. The local authorities, WWF Trento and Bear biologists meet two or three times a year to discuss Bear issues. The urgent need for the Trentino Bears is the protection of their habitat and, in particular, the halting of construction of forest roads in every small valley (15). In fact the Bears will disappear if the long planned Provincial Park Adamello-Brenta is not established to include all the areas inhabited by the Bear; at present the park's projected boundaries do not include all such areas (10,15). Three restocking experiments have been made in this area. The first two, in 1959-60 and 1969 were unsuccessful, the Bears being recaptured or killed. The third, in 1974 entailed the release of two Bears on the eastern slope of the Brenta Mountain, these were still thought to survive in 1976. Roth has strongly recommended that no more restocking experiments be carried out until the wild population has been fully studied (11).

The Tarvisio population occurs in the 24,000 ha Foresta di Tarvisio State Nature Reserve where forestry and pasturing are allowed. Within this are two small strict Nature Reserves - Rio Banco and Cucco (400 ha). In the autumn of 1982 a meeting of experts from Yugoslavia, Austria and Italy is to be held to discuss the best measures for protecting the Bears and to allow them to increase (18).

An 'Italian Bear Group' was established in 1982 and is intending to hold a meeting in 1983 to discuss the conservation of the animal.

Greece: Protected by Presidential Decree 67/1980 (24). Populations are reported to occur in the Pindhos range (Valia Calda) National Park in the Perivoli-Grevenon region, the Vikos/Aoos Gorge National Park, the Lake Prespa National Park, and the Paranesti-Dramas Protected Area (23). Surveys are needed to discover the numbers, status and distribution of Bears in Greece before a conservation plan can be initiated.

In 1980 the Eurasian Bear Group (established in 1978) and the European and Asian Big Game Commission (CIC) Bear Group initiated careful monitoring of Brown Bears in Europe and adjacent Asia (19).

Ursus arctos is listed in Appendix 2 of the 1979 Convention on the Conservation of European Wildlife and Natural Habitats. It is therefore designated a 'strictly protected fauna species' and is to be 'specially protected'. Each contracting party (in this case, France, Italy and Greece) is thus required to take appropriate and necessary legislative and administrative measures to ensure the special protection of the Brown Bear. In particular the following are prohibited:

1) all forms of deliberate capture and keeping and deliberate killing;
2) deliberate damage to or destruction of breeding or resting sites;
3) deliberate disturbance, particularly during the period of breeding, rearing and hibernation;
4) possession of, and internal trade in these animals alive or dead,

including stuffed specimens and any readily recognisable part or derivative thereof.

The Italian Brown Bear population is also listed in Appendix I of the 1973 Convention on International Trade in Endangered Species of Wild Fauna and Flora, trade in it or its products therefore being subject to severe restriction, trade for primarily commercial purposes banned.

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CARNIVORA: MUSTELIDAE	Status: EEC	World
Mustela lutreola (Linnaeus, 1761)	E	K

E. European Mink
F. Vison Européen
G. Europäischer Nerz

DISTRIBUTION

EEC: West and south-west France (1,2,3,4,5,6,7).

Also possibly the Federal Republic of Germany (1,2), although probably extinct (6,8).

France: In 1980 reported to occur in the following French Départements: Finistère, Loire-Atlantique, Charente-Maritime, Landes, Gironde, and perhaps Poitou (9). No longer occurs in Normandy (9). Van Bree and Saint Girons have published a detailed review of the Mink's French distribution prior to 1966 (2). They reported that in the previous hundred years the species had disappeared from many areas and its range had become fragmented (2,9); Mink disappeared from the Parisian basin about 1920 (with the exception of the Sologne (Loir-et-Cher)) and from the Massif Central well before then (2). For map see (2,7).

Federal Republic of Germany: The species has become extinct in the last few decades (6,8). In 1925 they were still seen along the Aller River in the surroundings of Wolfsburg and were apparently still present there in 1948 (6).

Italy: Van Bree and Saint Girons found no evidence of the Mink ever having occurred in Italy (2).

World: Ranges from Finland (although last record was in 1970), Poland and Hungary east to about 75°E in W. Siberia and south to the Caucasus (the Caucasian population is possibly isolated) (1,2,10).

HABITAT

Closely associated with fresh water, occurring especially by streams with ground vegetation in thick woodland (2,5,7). In the Loire region of France it occurs in marshes and low islands covered in vegetation in large waterways (11). It is solitary, nocturnal and swims well. A rocky cleft, hollow tree, or enlarged burrow of a Water Vole, Arvicola terrestris, is used as a den (7,11). Van den Brink describes its habitat as reed beds along slowly running rivers; ponds, especially in or near woods; marshes (12).

POPULATION

EEC: France: Numbers unknown, but in 1980 considered highly 'Endangered' by Saint Girons (9). In 1966 Van Bree and Saint Girons reported that the species was in danger of extinction in France and that absolute protection was essential for its survival (2).

World: Unknown, possibly threatened throughout its range.

THREATS

The European Mink requires undisturbed areas with lots of streams and thick vegetation to survive (2) and will therefore suffer from habitat loss as this type of habitat becomes increasingly scarce.
Smit and Van Wijngaarden report that:
'because of its very valuable fur and its predatory habits, the European mink is hunted intensively and it therefore was exterminated in a large part of its former range in Western Europe. Water pollution is also a serious menace. The construction of hydro-electric plants often results in radical destruction of their natural habitat. In some areas the European mink occurs together with the American mink (Mustela vison). Since the two species choose the same habitat and take similar kinds of food, they enter into competition and in some regions the European Mink seems to lose' (6).

CONSERVATION MEASURES

France: Protected under Article 1 of the decree of the 25th November 1977, it is therefore forbidden to destroy, mutilate, capture or stuff the species (13). Not known whether it occurs in any reserves. A survey of the species was begun in 1982.

The European Mink is included in Appendix 2 of the Convention on the Conservation of European Wildlife and Natural Habitats. It is therefore designated a 'strictly protected fauna species' and is to be 'specially protected'. Each contracting party (in this case principally France) is thus required to take appropriate and necessary legislative and administrative measures to ensure the special protection of the European Mink. In particular the following are prohibited:
1) all forms of deliberate capture and keeping and deliberate killing;
2) deliberate damage to or destruction of breeding or resting sites;
3) deliberate disturbance, particularly during the period of breeding, rearing and hibernation;
4) possession of, and internal trade in these animals alive or dead, including stuffed specimens and any readily recognisable part or derivative thereof.

REMARKS

The generic name Lutreola is sometimes used instead of Mustela (10).

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CARNIVORA: MUSTELIDAE Status: EEC World

Lutra lutra (Linnaeus, 1758) E/V V

E. Otter
F. Loutre
G. Otter

DISTRIBUTION

EEC: Belgium, Denmark, Republic of Ireland, Federal Republic of Germany, France, United Kingdom, Italy, Greece and the Netherlands (1,2). Extinct in Luxembourg (3).

Belgium: Scarce. Only a few observations have been made since the 1960s (5,8,94), the most recent in the Our Valley between St. Vith and the German border (4,9). In 1980 the species was observed in the Reserves of Les Marais d'Harchies near Mons (72). For maps see (9,94). Frechkop (1958) reported that the Institut Royal des Sciences Naturelles de Belgique has a collection of skins from the Provinces of Antwerp, Brabant Namur, Luxembourg, Liege, West-Vlaanderen and Hainaut (6), and De Sélys Longchamps (1842) reported Otters to be widespread and common along all rivers with good fish stocks (7,94).

Denmark: A 1979-81 survey indicated that it occurred in only a few localities in the Danish islands, and that in most parts of Jylland only scattered populations persisted (10,55,92).

Republic of Ireland: Widespread (11,12,13,14,80) except on the predominantly sandy east coast and around Dublin and its urban environs (15,80). Also recorded on several offshore islands (13). A systematic survey of 2373 wetland and coastal sites in Ireland (both the Republic and Northern Ireland) carried out between January 1980 and February 1981 found signs of Otters at 2177 (91.7%) of the surveyed sites (80).

Federal Republic of Germany: The main area for Otters is Lower Saxony, and this is the region where the species has the best chance of long term survival (1,40,61,62). The only other area where resident Otters still persist is in Schleswig-Holstein. However the population there is too small and too fragmented, and the habitat changes too extensive, to give much hope for its survival (61,63,64,65,66). A few Otters still occur in eastern Bavaria, in the Bayerischer Wald, however Becker who has been studying the population reports it to be virtually extinct, most of the remaining individuals being wandering animals from Czechoslavakia or Austria (67). Populations in Hessen and Rheinland-Pfalz reported by Muffling and Röben could not be confirmed by more recent studies (16,17,61,67,68).

France: Poorly known. Present in the Massif Central and West France (1). Pfeffer in 1980 described the Otter as occurring mainly in the west and south-west, in particular the Lac de Grand Lieu near Nantes (18). A five week tour of Otter habitats in western France by Jim and Rosemary Green in October-November 1980 found Otters largely restricted to four areas, three of these being in the uplands (of Brittany, the fringes of the Massif Central [only the fringes were visited], and the Pyrénées), and one in the coastal lowlands (of the Landes-Gironde). Populations were fragmented in the first three areas. Elsewhere in the west Otters have

virtually disappeared (24,81) For map see (81). Formerly the species occurred throughout France (19).

United Kingdom: In England populations exist in the south-west peninsula eastwards to Hampshire, in East Anglia, and in the north from Yorkshire to the Scottish border. In Scotland they are widespread, particularly in the northern half, the islands and the south-west, but thinly distributed over the rest of Scotland. In Wales they are absent from the industrial areas of the south and the northern coastal area, but occur elsewhere, and cross the border into Hereford and Salop (11,20,21,22,23,24). In Northern Ireland the species is widely distributed although does not occur regularly on the larger offshore islands (14,25).

Italy: Otters occur sporadically through much of the country having disappeared from many areas since the 1960s. They have never occurred on Sardinia and became extinct on Sicily about a century ago (26,27,86,87,88). A March/April 1982 survey of southern Italy (southwards of central Tuscany and north of the Marche region) by Macdonald and Mason found evidence of Otters at only 16 of 188 sites visited and they believed the species was on the verge of extinction (87). An investigation to discover the species distribution was also conducted from 1971 to 1973 by Cagnolaro et al (26)

Greece: Otters occur throughout mainland Greece and on the island of Corfu (74). An Otter survey of mainland Greece by Macdonald and Mason of the Vincent Wildlife Trust in March and April 1981 found the species to be widespread although distribution was not uniform (73).

The Netherlands: In 1982 Otters were reported by Veen, Vink and Leeuwenberg who are censusing the species, to be widespread although scarce. Most live in the north-east; in the west and central areas numbers are not so great although not declining rapidly either. In other parts of the country only remnant populations survive, spread over large areas (91). Veen et al reported Otters to occur in Groningen, Friesland, Overijssel, Gelderland, Utrecht, Noord-Holland and Zuid-Holland. Their occurrence in the IJsselmeer-polders, Drenthe, Zeeland, Noord-Brabant and Limburg is suspected but is as yet unconfirmed (91). The Otters range has decreased greatly since the start of the century (28,29,30,31,32,47,69,70,71).

Luxembourg: In 1980 the Direction des Eaux et Forêts reported the Otter to be extinct in Luxembourg (3). Occasionally animals may wander across the border from France (1). In 1974 a few supposedly still lived along the Eisch and Obersauer (34). A century or so ago Otters were found throughout the country but even by the 1930s were becoming quite rare (34).

World: The entire Palaearctic region except for the Siberian tundra, N. Africa east of Algeria, Arabia and south Iran, but including the British and Japanese islands. Also through the Himalayas and S. China to Malaysia; isolates in S. India, Sri Lanka, Taiwan and Sumatra (2).

HABITAT

The Otter lives in and around aquatic biotopes: lakes, rivers, streams, marshes and sea shores. Optimal habitat provides a good supply of easily caught fish (e.g. eutrophic waters) and suitable undisturbed cover for resting and breeding (20,21,35,36). The Otter is primarily a terrestrial mammal which has become extremely well adapted to aquatic

environments (20,21,36).

POPULATION

EEC: Severely threatened throughout the EEC except in Ireland, parts of highland Scotland, and possibly Greece; continuing to decline.

Belgium: The Otter has virtually disappeared and is certainly still declining. Three authorities rate it as 'Endangered' (5,8,47), whilst another believes it 'Vulnerable' (72). In 1982 it was described as extremely rare in Wallony with not more than 20 animals in the whole region (94). Van der Straeten thinks that the many new manmade fish ponds in northern Belgium will favour the Otter (5). Reuther reports estimates of 2-5 pairs in Flanders and 5-10 pairs in Wallony (1). Van der Straeten mentions an estimate of at least 35 individuals in Flanders in 1970 (5). In 1921 100 Otters were killed in Belgium (37). In the 1850s Otters were widespread and even considered pests in some regions (7,94).

Denmark: A survey carried out from 1979 to 1981 estimated a total population of about 200 (55), indicating a steep decline since 1960 when a survey estimated at least 1000 (10,38). The Otter is listed as vulnerable in Denmark in the Nordic Red Data Book (39).

Republic of Ireland: No estimate of numbers exists but generally regarded as not threatened and indeed considered reasonably common, (1,12,13,14,15,80). A nationwide survey in 1980-81 found the Otter to be relatively abundant. Fewer positive records were made around Dublin (though the city's effect was not as great as the surveyors had expected) (14,80). No evidence of a downward trend in numbers was indicated (80), although the surveyors warned that the wetlands and coastal areas are being subjected to increasing pressures which could lead to a dramatic decline in Otter populations (80). Within the EEC, the Irish Otter population must be one of, if not the, most abundant (1).

Federal Republic of Germany: 1980 total estimate was of certainly less than 450. A census in Lower Saxony from December 1977 to May 1979 estimated a total of 200-400 individuals (40), with the lower figure being more likely; the trend was undoubtedly downwards (61). A survey of Schleswig-Holstein by Dr G. Heidemann from 1978-80 only found three places regularly inhabited; at 16 other sites only single or wandering individuals could be confirmed. Of the 19 sites only one seemed saved, and all others might be lost in the near future (66,76). Becker in 1980 estimated not more than 10 Otters in eastern Bavaria but that this no longer constituted a resident population (67). The Otter is listed as critically endangered on the German national 'Red List of Endangered Animal and Plant Species' (43).

France: Estimates vary. In 1980 Pfeffer described the Otter as extremely rare; although he considered an estimation impossible, he thought it very likely that the total was only 100-200 and declining (18). Reuther gave a 1979 total population estimate of 'minimum 250-500 individuals', he described the population in the Massif Central as stable but in West France as declining (1). The 1980 survey of western France found Otters to be thinly distributed and populations to be highly fragmented. Signs of Otters were found at 46 (15%) of the 315 sites investigated and evidence of Otter abundance was comparable with that of England, a result the surveyors found surprising since most of the factors which adversely affect Otters appear less intense in France than

in England; only water pollution was noticeably more extreme and they hypothesized that this was possibly the reason for the decline (81).

United Kingdom: Precise numbers are unknown but the species is generally considered endangered in England and vulnerable in Scotland. Otters are absent from most of England and large areas of Wales, and elsewhere are present at relatively low densities; numbers continue to decline(20). Otters in Northern Ireland and the highlands and islands of Scotland are still relatively abundant although in lowland Scotland numbers have decreased and Otters are absent from some areas (11,14,20,21,22,23,24,25).

Italy: No estimate of numbers exists but the species is generally regarded as 'Endangered' (26,27,45,86,87,88). Cassola in 1980 reported that it was probable that the viable populations actually numbered only a few dozen totalling no more than some hundreds of specimens, and that the species was continuing to decline (86). In 1975 Wayre reported the population to be less than 100 and decreasing (45), and in 1974 the Italian World Wildlife Fund included it on their list of mammals believed to be in danger of extinction (46).

Greece: Numbers are unknown. Ondrias in 1982 reported that it had probably declined in recent years (74). Antipas believed it was a 'Rare' species (75). The 1981 Otter survey found that nearly two-thirds of 200 sites visited showed evidence of Otters (73); regions which appeared to hold 'good' populations included the western Peloponnese, the plains of the Kiphisos River, the Nestros River delta and the lowlands south of Komotini. By contrast the populations in the eastern Peloponnese and in the lowlands west of Thessaloniki appeared to be fragmented (73).

The Netherlands: Preliminary results from a nationwide census indicate that as of 1982 the Otter was vulnerable in the Netherlands, and although no actual data on numbers existed, an informed guess by experts was of a 'few hundred' still surviving, most occurring in the north-east. In the west and central areas populations were 'much smaller' but were not declining rapidly. The main stronghold was in the lake district of Friesland and Overijssel where the population was believed to be 'comparatively good' and not 'strongly' declining. The populations in Noord-Holland, Utrecht and Zuid-Holland were, although probably much lower, 'rather good'. The density of Otters in the river district of Gelderland was reported to be very low, and those in Groningen, and perhaps in Drenthe could be considered as part of the Friesland and Overijssel populations (91). Brouwer in the early 1940s reported the Otter to be in a precarious state in the Netherlands with a total population of 30-50 (30), however it is likely that the population was considerably higher, many Otter areas being unknown to him. A census in 1960 indicated 300 animals (29).

Luxembourg: In 1980 reported extinct (3). Steadily declined throughout this century. Reported as rare in the 1930s. In 1949 a bounty of 500 francs was paid for every dead Otter and the hunting record of 1949/50 records 33 Otters killed. By 1965 warning of the Otters impending extinction were sounded in Chasse et Peche (34) and since then the Otter has apparently disappeared from the country (3,34).

World: Numbers of the nominate subspecies lutra, to which the populations in the EEC belong, have greatly diminished in the present century and the Otter is now sparse or extinct in large parts of its original range,

although a reservoir is thought to exist in the USSR (36).

THREATS

Habitat destruction, water pollution, pesticides, human disturbance, and disturbance from hunting. Habitat destruction has occurred in parts of most water systems - drainage of lakes and marshes, clearance of bankside vegetaton, regulation of rivers and streams by dams, hydro-electric installations, concentration of human settlement along river, lake and sea shores, and pollution by industrial and agricultural wastes. As a result Otter populations have been fragmented into more or less isolated local breeding groups which are extremely vulnerable. Road casualties, fish traps, shooting, trapping and hunting (though the main impact of the last-mentioned is disturbance rather than mortality) are probably responsible for most of the depletion or extinction of local populations. Human disturbance in the form of water-based recreation, river management and habitat destruction is an increasingly important threat in many parts of western Europe (17,21,35,36, 48,73,81,84,85,86,94). Poisoning and possible reproductive impairment by persistent pesticides and herbicides could be another limiting factor. Chanin and Jefferies (1978) have thoroughly analysed the possible causes of the Otter's decline in Great Britain and have suggested that the advent of pesticide use, particularly of dieldrin in 1957-58 may have been the main cause behind the fall in numbers, and that habitat destruction and disturbance may have been important contributory factors in preventing a recovery (49).

A new threat to Otters comes from oil spills such as that which occurred at Sullom Voe in the Shetland Islands in December 1978. At least 14 Otters are known to have been killed, and a further 18 were seen oiled, but alive (20,84).

The extinction of the Otter in Luxembourg was caused mainly by the Otter bounty which eradicated the remnant population that survived to the 1940s (34), although the species disappearance from many areas was undoubtedly the result of habitat loss.

At the present time, there seem to be no major threats to the Otter population in the Republic of Ireland (80). Hunting, either for its fur, or for sport, or as a pest of fisheries is probably negligible in causing any decline (12), although the drowning of Otters in coarse fish traps used by inland fisheries, may be an important threat locally (15,80,93). However it is likely that in the future the increase in agricultural industrialization resulting from EEC farm subsidies will cause habitat loss and/or disturbance which will adversely affect Otters (20). Chapman has already observed a reduction in wetland habitat available to Otters because of local heavy pollution caused by intensive farming techniques (e.g. from silage effluent and slurry) and such activities are bound to increase if the EEC farm subsidies continue (14).

CONSERVATION MEASURES

Total legal protection is needed for the Otter throughout the EEC and it is of primary conservation concern that the Irish Otter population quickly receives total protection. Ireland has one of the only healthy Otter populations in the EEC, and it would be unwise to wait until it is endangered before protection is given.

The other major conservation requirement is the establishment of reserves or 'Otter havens' to protect the species habitat; an Otter haven

is an area of river, lake or coast where the Otter's requirements are given priority and human activity is prohibited or restricted.

Belgium: The Otter is considered a game species and is protected by hunting law (Arrête Royal du 10th July 1972); however since 1973 there has been a closed season in operation throughout the year and this is reviewed annually by a Minister (5,8); its destruction can however still be ordered by the Ministry of Agriculture as part of anti-rabies campaigns (51,52,53). Otters have been observed in the Reserves of Les Marais d'Harchies near Mons and at Le Blankaart near Ieper, although the latter does not seem to have a permanent population (5,8). In 1982 WWF-Belgium launched a campaign to protect the Otter and its habitat, and to support studies to determine the species distribution, the conservation measures needed, and the possibility of re-stocking in Flanders and Wallony (4). A national campaign for the protection of wild small carnivores (including the Otter) has been launched and is disseminating large amounts of educational material, including posters, leaflets and stickers (53).

Denmark: Totally protected by game law since 1967 when the hunting season was closed all year round. It does occur in some reserves; no captive breeding or releasing of Otters into the wild is planned (10,54). A systematic investigation into the distribution and status of the Otter was undertaken from 1979 to 1981 under the auspices of the Kalo Game Biology station and the Aarhus Natural History Museum (10,55). If the Otter is to survive in Denmark at least some areas where it is known to occur should be protected by law and managed to suit the Otter, and a number of Otter havens should be established (55).

Republic of Ireland: Protected under the Wildlife Act of 1976 which came into effect June 1st 1977 (1,14,15,56,80); exceptions for packs of Otterhounds are possible (1,14). Does not occur in any reserves (15), but does occur in the Glenveagh National Park (14).

The 'Joint Otter Group' established in September 1976 in the United Kingdom because of the growing concern about the status of the Otter, suggested in its 1979 report that the national survey programme in progress in the United Kingdom should be extended to cover the whole of Ireland. They felt this would 1) help prevent future changes in Otter numbers and distribution from going unnoticed. (The lack of adequate survey information in England and Wales caused a delay in the protection and conservation of the Otter and it is important to prevent this happening again). 2) Compared to Great Britain, Ireland is still very much unpolluted and undisturbed. However with the increased expenditure on agricultural industrialization resulting from Irelands membership of the EEC there will undoubtedly be more land drainage (20) and pollution (16), and consequent reduction in wetland, as well as increasing pressure on waterways (20). Extension of the national survey to Ireland would therefore monitor the effect on the Otter population and could ensure that conservation measures were taken quickly if they became necessary (20).

In response to these suggestions a survey of the Otter in Ireland was carried out by Peter and Linda Chapman of the Vincent Wildlife Trust from January 1980 to February 1981 (80). Several local studies have also been conducted or are in progress e.g. in Co. Antrim, Co. Down, Co. Wicklow, Co. Kildare, Co. Carlow, Co. Dublin, Co. Clare, Co. Waterford and Co. Derry (14).

Federal Republic of Germany: The Otter, according to Federal and Common Law, is strictly protected throughout the year in the entire country, and will receive additional protection from the new Nature Conservation Law (61). It is being studied in Lower Saxony by Claus Reuther, in Schleswig-Holstein by Gunter Heidemann, and in the Bayerischer Wald National Park and its environs by Rüdiger Becker. Their efforts to preserve the species in the country should be strongly supported. In 1982 the Minister of Agriculture in Schleswig-Holstein founded an Otter specialist group with the aim of coordinating and intensifying protection and restoration of Otter habitats in the Province (78).

A private organiztaion 'Aktion Fischotterschutz' was founded in 1977 by Reuther, and became a registered association in 1979. It aims to promote and co-ordinate Otter research and conservation projects. As of 1980 it promoted the following projects:

i) a study of the vegetation of Otter habitats; ii) a method of classifying Otter habitats; iii) population status, biotope analysis and protection possibilities for the River Wümme - one of the key areas for Otters in Lower Saxony; iv) regional surveys and inquiries as a basis for Otter protection.

All studies are financed by the organization, and partly subsidized by the World Wildlife Fund, the supreme hunting authority and the supreme nature conservancy authority of Lower Saxony. Additional field studies are planned, including the establishment of the first artificial Otter holts in the autumn of 1980. Aktion Fischotterschutz and the supreme hunting and forest authority of Lower Saxony together also maintain a research enclosure in Oderhaus where work is carried out with captive bred Otters obtained from the Otter Trust in the United Kingdom.

As well as field work Aktion Fischotterschutz has started initiatives for better legal protection of Otter habitats, for a stricter committment to international Conventions such as CITES; and a large-scale public awareness campaign involving newspapers, magazines, radio and television. Results already include 15,000 signatures against the canalization of the River Wümme. The organization hopes that in time Otter havens can be established on this river (61).

Reuther has made the following suggestions for Otter conservation in Lower Saxony and in Germany as a whole.
i)The need for a co-ordinated protection programme.
ii)The construction of artificial holts to improve breeding, as well as to simplify census counts and biological studies.
iii) Only organizations engaged in scientific research should be allowed to import Otters and maintain them in reserves.
iv) The availability of dead, sick, wounded or helpless Otters for scientific research would help to increase the knowledge of the species. A centre for treating the rearing, wounded, sick or helpless Otters should be created.
v) Increased legal protection against sewage dumping into lakes and streams as well as regulating the reshaping and maintaining of them is essential.
vi) Special protection areas, 'Otter Havens' should be established. These areas would serve primarily as breeding and feeding grounds. For Lower Saxony this would require the amendment of the Landesjagdgesetz

(Hunting Law).
vii) The Lower Saxony Hunting Law should be brought into line with the Federal Hunting Law in order to illegalize not only all encroachments on hunted bird species but also on all hunted species which are endangered.
viii) The establishment of an International Stud Book so that trade in Lutra lutra can be restricted to only registered animals. Minimum requirements for transporting, housing and caring for Otters in captivity should also be drawn up (40).

France: The Otter has been protected throughout France since 1972 by the hunting law (1). The Lac de Grand Lieu is to become a nature reserve but fishing with nets and traps will be allowed (18) and since Otters drown in fishing nets, the reserve will not greatly benefit the species. A 'Groupe Loutres' exists (94).
In 1979 the Federation Rhône-Alpes de Protection de la Nature began research to determine whether the Otter still occurred in parts of Isère (57). A preliminary survey of the Otters distribution in western France was carried out by Jim and Rosemary Green in October/November 1980 (81).

United Kingdom: The Otter is protected in Great Britain (England, Scotland and Wales) under Schedule 1 of the Conservation of Wild Creatures and Wild Plants Act, it is therefore an offence to kill, injure or take an Otter except for actions such as mercy killing or taking for the purpose of tending a sick animal. There are also restrictions on their sale, alive or dead, or as skins or skeletons; guilty persons are liable to fines. In Northern Ireland there is currently (1982) no protection for Otters, although legislation (the Wildlife Protection Order) is being prepared; the species is already fully protected in National Nature Reserves (25).

By the beginning of 1980 many Otter havens had been established in England and Wales (20), and some in Scotland (90). No Otter havens are currently being planned for Northern Ireland (25).

Several conservation groups concerned specifically with the Otter have been established -- The Otter Trust specialises in the breeding of Otters and in furthering their conservation particularly via public awareness campaigns and the establishment of Otter havens. The Vincent Wildlife Trust focuses on field studies and the establishment of Otter havens.
In 1976 the 'Joint Otter Group' was set up by the Nature Conservancy Council and the Society for the Protection of Nature Conservation. Its purpose was i) to inquire into the biology, status and distribution of the Otter in Britain; ii) to establish what additional information should be obtained by research and survey; and iii) to consider what measures should be undertaken nationally and locally to conserve the Otter (20).
Its first report, Otters 1977, drew attention to the limitation of the Otter's distribution and status surveys which had at that time occurred. As a result three national surveys were started during the summer and autumn of 1977 in England, Scotland and Wales (20,21). (A survey of Ireland was begun in 1980). The report also recommended total protection of the Otter and the establishment of Otter havens. The first has been achieved and the latter has made good progress (20,21). Their Otters 1979 report recommended more research into factors limiting Otter populations; protection of breeding sites, minimization of habitat destruction; enlightened river management; legislative protection in Scotland (now in force); repeat surveys to monitor trends; more research on the Otters distribution; a study of the Otters vulnerability to oil spills;

and a ban on Mink hunting on rivers inhabited by Otters since it is believed Mink hunts cause Otters considerable disturbance (20,58).

Italy: Act 27 December, 1977 No. 968 which came into effect in January 1978 gave the Otter all year round legal protection from being killed or captured (86), although obviously enforcement is extremely difficult. The species occurs in several protected areas, e.g. the Abruzzo National Park, and the Lake Durano Wildlife Refuge (86) and has also been the subject of several surveys (26,27,45,86). However no conservation plan involving the adequate protection of special sanctuaries has yet been developed, and is likely to be difficult to carry out because of opposition by hunters and anglers (86).

Greece: The Otter is a game animal in Greece although a closed season operates all year round (74). It is known to occur in Lake Prespa National Park near Florina (89).
Although noone is studying the species, it was the subject of a three week survey in March/April 1981 (73). Better knowledge of the distribution, status and threats of the animal is needed before specific conservation measures can be suggested.

The Netherlands: The Otter is considered a game animal and therefore comes under the game laws. It was added to the 1923 Hunting Law on 16 January 1942. However a closed season has existed ever since so effectively the species has been fully protected; a special licence is needed for the possession of skins, stuffed animals and live specimens (28,47,70,71). Financial compensation is obtainable from the Game Fund for any Otter damage (69). No special reserves have been established for the Otter although in some nature reserves where they occur special areas are closed to the public to act as refugia (59). Protection of known Otter habitats is needed (28,47,70,71); the southern Flevo-polder would be particularly suitable as a nature reserve as it gets little human disturbance and has a good fish supply (71). A census of Otter distribution, numbers and status is being undertaken by Jan Veen (Amsterdam University), Jan Vink (Forestry Commission) and F. Leeuwenberg (Directie Faunabeheer) (91). A study to find out the impact of the increasing Musk-rat population on the Otter has been suggested as necessary (59).

Luxembourg: The Otter has been protected since 1972 by the hunting and nature conservation law which gives it all year round protection (1,34).

Two Colloquia focussing on the Otter and its conservation have been held: in 1979 in Gottingen, Germany, and in 1981 in Norwich, England.

The Otter is included in Appendix 2 of the 1979 Convention on the Conservation of European Wildlife and Natural Habitats. It is therefore designated a 'strictly protected fauna species' and is to be 'specially protected'. Each contracting party (i.e. all ten EEC countries) are thus legally required to take appropriate and necessary legislative and administrative measures to ensure the special protection of the Otter. In particular the following are prohibited:
1) all forms of deliberate capture and keeping and deliberate killing;
2) deliberate damage to or destruction of breeding or resting sites;

3) deliberate disturbance, particularly during the period of breeding, rearing and hibernation;
4) possession of, and internal trade in these animals alive or dead, including stuffed specimens and any readily recognisable part or derivative thereof (60).

The Otter is also listed in Appendix 1 of the 1973 Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) trade in it or its products between acceding nations thus being subject to severe restriction, trade for primarily commercial purposes being banned.

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CARNIVORA: FELIDAE	Status	EEC	World
Felis lynx Linnaeus, 1758		E	NT

E. Lynx
F. Lynx
G. Luchs

DISTRIBUTION

EEC: France and Greece (1,10).

An introduction in 1970/71 to the Federal Republic of Germany failed after initial success; a further project was initiated in January 1982 (4,12,31). Two males were released in Gran Paradiso National Park in the Italian Alps in 1975; one died in France (see below), the other disappeared (5,6,10).

France: A residual population exists in the Pyrénées; observations from 1960 to 1978 have been summarised (10,20) and cover two areas: the eastern Pyrénées Atlantiques and the Hautes Pyrénées, and the Carlit-Madrès area of western Pyrénées Orientales. In the former region records were scattered over a large area, though Glass considered the recent presence of Lynx was definite in at least five areas: Isseaux, the Massif d'Aran, the Haute Vallée de Brousset, Jaout and Gèdres (10,20), while Chazel identified the Massif d'Aran and the Haute Vallée de Brousset (Vallée d'Ossau) as the two main population nuclei (10,19). Breeding has been confirmed in this general area in 1974 and 1978. Observations have become increasingly frequent since 1960, indicating that the population could be increasing in size and range (10,11). Lynx from the Swiss Jura (where they have been reintroduced) have crossed the border into the French Jura, with over 10 confirmed observations up to 1979, mainly since 1974, in the winter months, in the Risoux Massif, but also in the Vallée du Doubs and in the Laufonnais (Pontarlier district) (10). Several Lynx have been reported killed there since 1973, including one in 1974 near Thoiry and another in 1976 in the Département de Jura (10). There is evidence of Lynx in the French Alps; one of the males introduced in 1975 to the Gran Paradiso National Park in Italy moved westward and was found dead in France in the Département de l'Isère in May 1976, the other disappeared but may also have moved west (3,5,10). In Haute Savoie the presence of Lynx for at least the four years up to 1980 has been confirmed by faecal examination at Geneva Museum. The animals probably originated in the Swiss canton of Valais (3,10). There are recent reports from the Diois (1975) and Queyras (1970-78) regions of the French Alps but they remain unsubstantiated (10). Despite over 23 unconfirmed reports since 1930 of Lynx in the Vosges, no certain proof of their existence has been established (10). Lynx once occurred throughout France, but disappeared from the plains during the 16th century, and withdrew to the mountains, where they gradually died out (10), being believed to have disappeared from the Vosges in the 18th century, from the Jura in 1885, from the Massif Central in 1875, and from the Alps (Queyras) probably between 1930 and 1945 (10).

Greece: Distribution poorly known and conjectural; Miric in 1978 noted that Lynx could be expected to occur in the Pindus range and in forested mountainous areas along the Greece-Yugoslavia Border (33). The species

is reported to occur in the Paranesti-Dramas National Park in Drama Prefecture in Macedonia (30). In the 19th century the Lynx was apparently well represented in Greece with a specimen obtained in 1862 as far south as Attica (32).

Federal Republic of Germany: Lynx became extinct during the 19th century, persisting until the 1840s in the Bavarian border region, the Alps and Wurttemberg (22,31). In 1970/71 several Lynx (including five wild specimens captured in Slovakia) were introduced into the Bayerischer Wald National Park in Bavaria near the border with Czechoslovakia (12,31). The range occupied by the animals expanded considerably at first from 10,000 ha in 1971 to 40,000 ha in 1978, most of this being outside the National Park boundaries with animals also apparently spreading into Czechoslovakia, there being two records in the 1977/78 winter in Kubany (12,17,22). However, only one animal is definitely known to have survived after 1979 (and was still alive in late winter 1981/82) (31). The reintroduction thus failed after an initial success. A further pair were released into the Bohemian Forest in January 1982 and the release of nine more is planned (31).

World: The taiga forest from Scandinavia to eastern Siberia; montane forest in Europe (now confined to Iberia, Balkans and Carpathians), Caucasus, Asia Minor, Kopet Dag and in all the main ranges of central Asia from the Altai to Kashmir and east to Manchuria, Kansu, Tsaidam and south-east Tibet; Sakhalin; the taiga zone of North America (7).

HABITAT

Within the EEC the Lynx is now confined to forested, mountainous areas. However, in regions where it is not persecuted it also occurs in lowland forests, especially areas of mixed coniferous/deciduous woodland which show the greatest abundance and diversity of prey (1,2,14).

POPULATION

EEC: Unknown, but certainly not more than a few tens.

France: Estimates of 10-15 (10) or 5-15 (22) were given for the Pyrenean population in 1979, with perhaps one to three individuals from reintroduction (i.e. having wandered from Switzerland or Italy) (22).

Greece: Unknown, though in 1978 was reported as apparently very rare (32). Considered 'Endangered' by Antipas in 1982 (33).

Federal Republic of Germany: The 1970/71 reintroduction to Bavaria eventually failed (see above); accurate estimation of numbers following the reintroduction proved impossible, though breeding definitely occurred on several occasions and an initial increase in population paralleling the increase in range is believed to have taken place (12,17,22). The population is believed to have died out principally through illegal hunting and also possibly by dispersing into Czechoslovakia (see above). The animals largely moved out of the Bayerischer Wald National Park, where they had originally been introduced, occupying instead the large areas of forest to the north-west which appeared to constitute more favourable habitat. In summer they principally occupied more upland areas, consisting mostly of State Forest where they were relatively secure from hunting; in winter, however, they tended to move into private forest in the valleys and were subject to

illegal hunting (12,31). By 1978/79 only two individuals were definitely tracked, one of these moved a considerable distance from the core area and quickly disappeared; the other survived at least until late winter 1981/82 (see above) (31).

World: Not threatened.

THREATS

Lynx disappeared in general as a result of hunting and poisoning, and shrinkage of forest areas. It has been hunted for its valuable fur and is today much persecuted by hunters and farmers, being considered a pest of game animals and livestock (4).

CONSERVATION MEASURES

Outside the Pyrénées and Greece, the principal conservation measure for Lynx in the EEC is reintroduction to suitable areas. Such reintroduction projects have generated a considerable amount of interest and several symposia on the Lynx in Europe have been held (at Murau/Steiermark, May 1978; Spiegelau in Bavaria, July 1978; Strasbourg, October 1978 (2,21,23)) covering both surviving wild populations and planned and existing reintroduction projects. Opposition to such projects is most prominent from local hunters who fear great reductions in game populations (14,17,18). However, authorities at the above symposia have stressed that Lynx have minimal impact on populations of game species, little effect on domestic livestock and could conceivably benefit grouse and other game bird populations by preying on foxes, feral cats and dogs. Lynx do not appear to be highly susceptible to rabies (only 0.6% of 1000 killed in Czechoslovakia in 10 years were carriers and these were infected by the virtually non-contagious paralytic form) and it is thought possible that they may control the spread of the disease by preying on foxes, especially nomadic cubs which are believed to be its principal vectors (14,15,16,29). The importance of adequate preparation for such reintroduction projects is stressed, with regard to choosing areas capable of supporting a self-sustaining population and ensuring acceptance among the local human population by education and information programmes (14,15,18).

France: Protected by law throughout France except in the Départements of Mosel, Bas-Rhin and Haut-Rhin (1). Several groups are actively involved in promoting Lynx reintroductions (22) and numerous studies have been carried out on possible reintroduction sites with many such sites identified, e.g. in the Alps at Chartreuse, Massif des Bauges, Vercors, Chablis, Queyras and Voaye (the last two in the southern Alps) (10,13). Noblet in 1979 considered Vercors to be the most promising French alpine site (13). Projects also exist in the Massif Central (the Cévennes and Mercantour) and the Vosges Mountains in Haut-Rhin (3,10,28). In the latter, reintroduction is intended to start in the autumn of 1982 (31). The 45,000 ha Pyrénées National Park covers part of the Lynx's apparent range in the Pyrénées (30).

Greece: Does not appear to be legally protected (34); is reported to occur in the 450 ha Paranesti-Dramas National Park (30) though this would certainly not be large enough to support a viable population. Surveys of the species in Greece are recommended to enable a conservation plan to be drawn up which should include full legal protection and the provision of adequate protected areas.

Federal Republic of Germany: Protected by the game law with a closed season all year round (4,24). The introduction to the Bayerischer Wald National Park was initially successful (see above) and a further introduction project is underway in the Bayerisch-Böhmischen Forest. Other areas in Germany, such as the Bavarian Alps, may be suitable for reintroductions although some projects which had been considered (e.g. the Harz Mountains, Pfälzerwald and Schwarzwald (25,26,27)) have been abandoned as impracticable (31).

The Lynx, Felis lynx, is included on Appendix 3 of the 1979 Convention on the Conservation of European Wildlife and Natural Habitats. Each contracting party must therefore take appropriate and necessary legislative and administrative measures to ensure the protection of the Lynx. Any exploitation must be regulated to keep populations out of danger.

The Lynx is also listed on Appendix II of the 1973 Convention on International Trade in Endangered Species of Wild Fauna and Flora, trade in it or its products between acceding nations being subject to regulation and monitoring.

REMARKS

The taxonomic status of the Pyrenean population has been the matter of some confusion although examination of remains, including a skeleton found in the Pyrénées National Park in 1962, indicates the subspecies to be the Northern Lynx (Felis lynx lynx) rather than the Iberian Felis lynx pardina which is itself sometimes considered a separate species, Felis pardina (10,11). The Lynx is often placed in a separate genus, Lynx (34).

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ARTIODACTYLA: CERVIDAE Status: EEC World

Cervus elaphus corsicanus Erxleben, 1777 E E

E. Corsican Red Deer
F. Cerf Corse
G. Korsischer Rothirsch

DISTRIBUTION

EEC: Italy. Recently extinct in France (1,2,3,4,5,6,7,8,18).

Italy: Confined to three mountainous areas in Cagliari Province in southern Sardinia (1,5,7,8): i) the Mounts Arcosu and Lattias area of East Sulcis south-west of Cagliari (1,3,5), covering approximately 200 sq. km (5); ii) the Sette Fratelli mountain area north-east of Cagliari, covering less than 100 sq. km (1,5,7); iii) a small group near Montevecchio in an area of approximately 20-30 sq. km (1,5,7). For map see (8,18).
The Deer's range on the island contracted greatly in the first half of the 20th century and by the 1950s was confined to the south (1,7,8).

France: The Deer became extinct in Corsica in 1969 when the last animals were shot by a poacher during an official Wild Boar battue (1,7,9). The last refuge was an area straddling the Casabianda Natural Reserve and the Pinia Estate, in a plain along the east coast (10). Information about its original distribution in Corsica is very scarce, however Schenk has received reports that formerly Deer occurred in much of central Corsica, especially in the forests along the Tavaro River (Zicavo, Corrano, Olivese) and the Bavella region (Quenze, Zonza) where the last individual was killed about 1910 (1,10).

World: Depending on the taxonomy followed this subspecies of Red Deer either does not occur elsewhere in the world (12) or is the same subspecies that occurs in Spain and North Africa (13).

HABITAT

Hill and mountains up to 1000 m, intersected by deep valleys with steep slopes covered by the evergreen Mediterranean maquis. All three areas in Sardinia are virtually free from human disturbance (5,7,14,18).

POPULATION

EEC: Italy: The total in Sardinia in the autumn of 1979 was at minimum 250 and was probably closer to 300 (4,5) - at least 140 in the Mounts Arcosu and Lattias area, about 90-100 in the Sette Fratelli Mountains and 8-10 in the Montevecchio group. These figures were based on counts of roaring stags during the 1979 rut, plus the number of hinds, calculated on the provisional sex ratio of 1:1.5. They are considered minimum values. Between 1967-1979 the density decreased appreciably in the Sette Fratelli Regional Forest and adjacent areas (5).

THREATS

The decline of the Deer in Sardinia and its eradication from Corsica was caused mainly by poaching and habitat loss (1,2,3,5,7,8,15), although disease did play some part (1,5). Habitat loss was due to burning of vegetation, domestic stock grazing, deforestation and mountain road

building (1,2,3,7,14). Road building is on the increase, both for forest management and development of tourism. Such activity not only modifies habitat but facilitates access to the most remote areas by the general public, and more especially by poachers (5,7). An estimated annual loss of 30-40 Deer to poaching has been calculated for the 1973-78 period. At least 11 animals were killed by poachers from September 1979 to 10 February 1980, according to reliable information. Poaching occurs mainly during hunting of Wild Boar (Sus scrofa), and Thrushes (Turdus spp), but is also frequent all year round using wire snares, and by individual Deer poachers and small hunting parties (5).

CONSERVATION MEASURES

The survival of this Deer will depend on the control of poaching and the prevention of habitat loss.

Italy: The Deer has been totally protected by law in Sardinia since 1940, but penalties for poachers have been very low. Under the new Regional Hunting Law, penalties for Deer poachers during the hunting season 1980/81 increased appreciably -- to 10 million lire (about US $12,000 (1,5)). The first survey to determine the status of the Red Deer in Sardinia was undertaken in 1967/68 by the Italian WWF and suggested the establishment of reserves and improvement in surveillance (14,15,16). This has been partly realised (5). The survival of the Deer can mainly be attributed to the existence of private game reserves (Monte Arcosu, Monte Nieddu and Monte Arrubiu), regional forests (Sette Fratelli, Piscinamanna) and reserves (Bandita di Caccia and Oasi Faunistica) which cover 200 sq. km of the total Deer range of 320 sq. km. Permanent, but still insufficient, surveillance is guaranteed in the game reserves and in the regional forest by game-keepers and forest guards, while only occasional checks are carried out in the remaining areas. It may be significant that the highest Deer density occurs inside the two game reserves of Monte Arcosu and Monte Nieddu. Unfortunately these very important conservation areas will be abolished in the near future under the new regional hunting law.
In the framework of UNESCO'S 'Man and the Biosphere' Programme, Italy has proposed a Biosphere reserve in the Piscinamanna region for the Mediterranean evergreen vegetation of the Quercus ilex type. This area is identical with considerable parts of the south-western range of the Deer and will obviously be of conservation benefit to the taxon.
Research to discover the distribution and numbers of Deer was carried out during the rutting periods of 1973-1979 by WWF Sardinia in co-operation with the Forest Department, the Provincial Hunting Committee and private landowners (1,2,5). A new conservation project was begun in 1979 by Mr. Helmar Schenk (WWF Project 1708) (1,5). The project aims to co-ordinate the research and conservation efforts in Sardinia, to establish a captive breeding stock in Sardinia, to reintroduce the Deer into suitable habitats in both Sardinia and Corsica and to restore populations to sustainable yield levels (1,5). These efforts to preserve the Deer should be strongly supported.

By March 1980 an enclosure of about 5 ha had been set up by the Regional Forest Department in the Piscinamanna regional forest. The enclosure is near the forest station so that permanent surveillance will be guaranteed by the station staff. On the technical advice of Dr. Robert Schloeth, Director of the Swiss National Park, two large wooden traps were built in an open space in the Acquacallenti regional forest to

capture Deer for the breeding programme. Deer are frequent around the traps, but by March none had entered them. Official contact has been established between Sardinian and Corsican authorities for collaboration on the reintroduction of Deer (1,5).

France: The Deer was totally protected by law in Corsica. Plans exist for reintroduction of Deer from Sardinia to Corsica (1,5) and should be implemented at an appropriate time.

All Cervidae are included in Appendix 3 of the 1979 Convention on the Conservation of European Wildlife and Natural Habitats, they are therefore to be protected, although a certain exploitation is possible if the population level permits.

REMARKS

The Corsican Red Deer (of Sardinia and Corsica) is listed in the IUCN Red Data Book (17).

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ARTIODACTYLA: BOVIDAE	Status	EEC	World
Rupicapra rupicapra ornata Neumann, 1899		V	V
E. Abruzzo Chamois F. Chamois des Abruzzes G. Abruzzengemse			
Rupicapra rupicapra cartusiana Couturier, 1938		E	E
E. Chartreuse Chamois F. Chamois de Chartreuse G. Chartreusengemse			
Rupicapra rupicapra balcanica Bolkay, 1925		V	K
E. Balkan Chamois F. Chamois des Balkans G. Balkangemse			

DISTRIBUTION

EEC: Italy: *R. r. ornata* (1,2,5,6,9,10,15).
France: *R. r. cartusiana* (3,5).
Greece: *R. r. balcanica* (8,10,14).

Italy: *R. r. ornata* is found only in the Abruzzo National Park in the Apennine Mountains. Seven main herds exist, scattered on mountains from Mount Amaro (1862 m) to Mount Meta (2200 m). Small herds or isolated individuals, mostly males, are also sighted in neighbouring areas (1,9,10).

France: *R. r. cartusiana* is now confined chiefly to the Forêt Domaniale (a woodland area of 8000 ha south of the Guiers Vif river, managed by the Office National des Forêts) (5). Former range included two-thirds of the Chartreuse Massif, Isère, an area of about 35,300 ha (5).

Greece: *R. r. balcanica* (including *olympica*) is found only in the north in the mountains of Epirus, Macedonia and Thrace where it survives in isolated populations (12). For map see (10). (This subspecies also occurs in Bulgaria, Yugoslavia and Albania (8,10,14)).

Two other Chamois subspecies exist within the EEC (2): *R.r. rupicapra* in the Alps (French, Italian and German), (also in the Swiss Alps, the Tirol and Slovenia). *R.r. pyrenaica* in the Pyrénées — in the high valleys of the central chain, and in Canigou where the species has been reintroduced (3).

World: Elsewhere Chamois occur in N.W. Spain, the Carpathians, the Tatra Mountains, the Balkan Mountains, the Caucasus, N. Asia Minor, and the Taurus Mountains (2). For map see (2,8,14).

HABITAT

R. r. ornata: The Abruzzo National Park lies between 700-2000 m, and includes a large part of the high valley of the Sangro River. Beech forests grow on the mountain slopes and the higher parts are covered by alpine grassland interspersed with barren, rocky, mostly calcareous areas

(1).

R. r. cartusiana: The Forêt Domaniale consists of mixed forest with scattered limestone outcrops and is bounded by cliffs. In winter most of the Chamois move to very low altitudes (5), although some, particularly adult males live permanently at low altitudes (11).

POPULATION

EEC: Italy: R. r. ornata in 1982 numbered between 350-400 individuals; numbers since the mid-1970s are reported to have stabilized (9). Around 1915 the park population plummetted to only 30-40 animals. It then increased between the two world wars, but decreased again to 40 in 1949, however in 1969 a census recorded 150-200, numbers then more than doubled between 1971-1981 (1,5). The last Apennine Chamois outside the park was shot at the end of the 19th century on the Gran Sasso Massif (1).

France: R. r. cartusiana: 1980-82 counts indicated 100-150 animals compared with 150-200 recorded in a 1976 census (5,11).

Greece: R. r. balcanica: No census has been carried out but in 1982 Ondrias thought that only a few existed, trend unknown (12); and Antipas described it as 'Vulnerable' (13).

The other two subspecies which occur within the EEC are not considered threatened. R. r. rupicapra in 1980 was reported to number about 125,000-130,000 and increasing (4,5), comprised of about 25,000-30,000 in France and increasing (4), 36,500 in the Federal Republic of Germany (5), and about 62,000 in Italy (5). R. r. pyrenaica in France was estimated at 10,000 in 1982 and stable in population trend (3300 occur in the Parc National des Pyrénées). The subspecies was greatly depleted by hunting after the Second World War but recovered owing to the establishment of hunting reserves; 75% now occur in national parks or game reserves (5,17). An epidemic of infective kerato-conjunctivitis in 1982 wiped out 40% of animals in some areas but is thought not to have significantly affected the status of the animal (17,18).

World: As a species R. rupicapra is not threatened. The nominate subspecies R. r. rupicapra alone numbers about 180,000, excluding the population introduced into New Zealand (5).

THREATS

R. r. ornata: Chamois in the Apennines outside the Abruzzo National Park were exterminated by shooting, habitat alteration and livestock raising, and these factors, plus shepherd dogs, especially feral ones, and 'controlled' shooting in the zone surrounding the park, make it impossible for the Chamois to expand their present range into areas outside the park. Wandering animals (usually males) have little chance of survival (1). Some poaching occurs within park boundaries, but its present level (about 10% of the population per year) seems to have relatively little impact on the survival of the Chamois (5,9). Wolf predation is not heavy but is difficult to assess because remains of killed animals cannot readily be distinguished from those merely scavenged by wolves (5). Some evidence exists to suggest that re-introduced Red Deer have begun competing for food in some areas with Chamois (9).

R. r. cartusiana: Four main threats have been identified (5). 1)

Competition for food and space with introduced Roe Deer (Capreolus capreolus), Red Deer (Cervus elaphus), and Mouflon (Ovis ammon). Red Deer and Mouflon are dominant to Chamois which thus tend to be pushed into marginal habitat sited on rocky slopes of the forest edge where food is scarcer, and where the Chamois are more exposed to poaching. All three introduced species are steadily increasing in number. Attempts to eradicate, or at least reduce, numbers of the Red Deer have so far met with opposition from local hunters who favour it as a game animal (11). 2) Poaching which is frequent particularly in the lower areas bounding the forest and is traditionally aimed at the Chamois. (Surveillance by foresters is nonexistent.) 3) Hybridization with R. r. rupicapra introduced to the northern part of the Chartreuse Massif in 1974 by hunting associations and the Office National de la Chasse. 4) A scarcity of subalpine meadowland in the Chamois summer range, which is further decreased by disturbance from tourists and sheep (5). If present conditions prevail the subspecies is likely to disappear by the end of the century (5).

R. r. balcanica: Documentation concerning specific threats was not located.

CONSERVATION MEASURES

Italy: R. r. ornata is protected by law. In 1977 poaching was reported to be rare and the wardens' surveillance effective, at least within the Park boundaries; controlled shooting was allowed in the zone surrounding the park (1). A field study by Sandro Lovari, sponsored and partly supported by the Centro Studi Ecologici Appenninici of the Abruzzo National Park, began in January 1976. It is hoped this study will lead to reintroduction of Chamois in other Apennine areas which must of course be adequately protected. Since single isolated populations are threatened by many dangers - epidemic diseases, natural disasters, human interference - leading possibly to extinction, the establishment of other populations elsewhere is highly desirable (1). To this end a group of Chamois was captured in 1981 and is held in a large enclosure in the Abruzzo National Park; they will form the breeding nucleus for reintroductions (9).

France: R. r. cartusiana is apparently not protected by law (5). If this taxon is to persist then the following conservation measures are needed: eradication of Red Deer and Mouflon from the Chamois range; eradication of the introduced R. r. rupicapra; banning of all hunting for at least ten years; enforcement of effective anti-poaching measures (5), and a conservation education programme focusing on the Chartreuse Chamois and its plight (11).

Greece: R. r. balcanica is fully protected in Greece (12). It is known to occur in the following protected areas: Valia Calda N.P. (12,935 ha) in the Perivoli-Grenon region of the Pindos Range; Vikos/Aoos Gorge (3300 ha with a 12,255 peripheral zone in Epirus; and Paranesti-Dramas (450 ha in Drama Prefecture in Macedonia) (16). A study is required to learn more of the distribution and status of this animal as the basis for any appropriate conservation plan.

The Chamois is listed in Appendix 3 of the 1979 Convention on the Conservation of European Wildlife and Natural Habitats, it is therefore to be protected although a certain exploitation is possible if the population level permits.

The Abruzzo Chamois is also listed in Appendix I of the 1973 Convention on International Trade in Endangered Species of Wild Fauna and Flora, trade in the animal between acceding nations therefore being subject to severe restriction, trade for primarily commercial purposes being banned.

REMARKS

The Abruzzo Chamois may be sufficiently distinct from other Chamois to warrant promotion to full species level (8,9); further studies are necessary, though some taxonomists (e.g. Neumann, Trouessart and Miller) already consider it a distinct species (10). It is a slender animal with exceptionally long horns and a winter coat of distinctive colours and has been the subject of a number of research projects concerned with its behaviour, ecology, parasitology, caryology, immunogenetics and systematics (5).

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ARTIODACTYLA: BOVIDAE	Status:	EEC	World
Ovis ammon musimon Pallas, 1811		V	V

E. Mouflon
F. Mouflon
G. Mufflon

DISTRIBUTION

EEC: Italy and France where its original range is restricted to Sardinia and Corsica (1-11,18,19). Within the EEC introduced Mouflon also occur in Belgium, Denmark, mainland France, the Federal Republic of Germany, mainland Italy, Luxembourg and the Netherlands, but see 'Remarks' (2,12,18,19).

Italy: Confined to Sardinia (4,6,9,10). Schenk has prepared a detailed review of the distribution and status of the Mouflon in Sardinia based on information gathered between 1975 and 1980 (6). Within its original range the species occurs only in Nuoro Province: in Monte Albo; Sopramonte in the north between Oliena and Dorgali, and in the south between Orgosolo and Urzulei; the coastal range from Dorgali to Baunei; Monte Fenalbu and Monte Orosei; the Mtns between Sopramonte and Gennargentu, particularly in the Regional Forest of Montes at Mandra de Caia; the Mtns of Gennargentu - in the south between Arzana and Villagrande and in the north from Fonni to Desulo; the Funtana Cungiada Mtns; the Foresta di Monte Arbu, Perda Liana, Cuccuru and Mufloni between Gairo, Villagrande and Seui; Monte Alastria and Monte Perdedu; Monte Armidda; Monte Idola and Punta Tricoli. A small isolated group in the north on the Altiplano di Buddoso/Piras is thought to have become extinct in 1977 (6).
There are two populations on Sardinia which were artificially established. One at Capo Figari and on Isola Figarolo from animals released in 1880, and another on Isola Asinara founded in 1956 from animals from Capo Figari (6). There are three captive herds: one established in 1975, in a 120 ha enclosure in the Regional Forest of Monte Arbu and another in an enclosure in the Regional Forest of Santulussurgiu, both are controlled by the Regional Forest Department. A third private enclosure of about 3 ha is sited at Monte Spada (6)

France: Confined to Corsica where it occurs in the Mont Cinto/Asco Reserve and the Bavella Reserve/Solenzara Mountains. Small herds also occur in the Forest of Bonifatto, the Incudine Massif and between the Ospedale Pass and Bavella (2). Thibault notes that the 'Asco' population extends from Tartagine in the north-west, to Evisa in the south-west, and to Asco in the east, while the 'Bavella' population extends from the south face of the Incudine Massif to Palire, south of Bavella (11). There is also a captive herd of several dozens in an enclosure near Venaco (11).

World: Also found on Cyprus (1,2,3) but see 'Remarks'. As well as occurring in other EEC countries, Mouflon have been introduced into Austria, Bulgaria, Czechoslovakia, Finland, the German Democratic Republic, Hungary, Poland, Romania, Spain, Switzerland, the USSR, the Tien Shan of Central Asia, Hawaii and elsewhere in the USA, and to the Kerguelen Islands in the southern Indian Ocean (2,12).

HABITAT

Two main habitat types can be distinguished in Sardinia. a) Calcareous mountains (e.g.,Monte Albo, Sopramonte, Coastal range, Monte Arbu/Tonneri) between sea-level (Baunei) and 1463 m (Monte Corrasi/Sopramonte), and covered with more or less dense Quercus ilex woods. b) Mountain steppe, partly overgrazed by livestock (eg., Mtns between Sopramonte and Gennargentu, Gennargentu), between 800 and 1800 m above sea-level with remnants of Quercus ilex forests and Erica arborea macchia which constitute cover for the Mouflons (6). Competition with livestock (sheep, cattle and goats) is extensive in the Gennargentu area from May to October. Vertical migration of Mouflon occurs in the Gennargentu from November to April when the higher grounds are covered with deep snow (6). The Mouflon's habitat in Corsica is described as sub-climax Mediterranean scrub and grasslands, usually at high altitude among rocks and scree; also coniferous and deciduous woodland fringes (2,11). Elsewhere introduced Mouflon have adapted to a wide variety of non-Mediterranean habitats (12).

POPULATION

EEC: 1980 total estimate of 2300-2800 and increasing.

Italy: The Sardinian population is believed to have slightly increased between the years 1975-80, and in 1980 was estimated at 2000-2200, of which 1100-1360 occurred in the original range (6). Estimates for the different areas were: Monte Albo: about 20-30; Sopramonte: 230-270; Coastal range from Dorgali to Baunei: 50-60; Monte Fenalbu: 40-60; Mtns between Sopramonte and Gennargentu: 250-350; Gennargentu: 210-230; Foresta di Monte Arbu, Perda Liana, Cuccuru and Mufloni: 250-300; Monte Armidda and Ogliastra: at least 50-60 (6).

Introduced populations total about 500 animals: Capo Figari and Isola Figarolo: about 200; Isola Asinara: about 300 (6).
The total in captive herds in 1980 was about 37-45: Foresta di Monte Arbu: 15-20, Santulussurgiu: about 10; Monte Spada: 12-15 (6).

France: 1979/80 estimate for Corsica was of 200-500 (11,12) or 300-400 (13); status is considered slightly better than in the late 1960s (13).

World: If one considers O. a. musimon to include the Sardinian, Corsican and Cyprian populations, the latter numbering 300 and increasing in 1980 (14), then the total world population in the original range is 2500-3100; including Mouflon that have been introduced elsewhere then the population numbers many,many thousands (2,12,15,18).

THREATS

Principal threat has been, and remains, poaching (4,5,6,7,8,9,10,16). In Sardinia, Schenk states there has been insufficient surveillance and inadequate penalties. Poachers are either shepherds and local hunters from mountain villages, or hunters from the major Sardinian towns in pursuit of trophies. A very approximate estimate of annual losses to poaching for 1975-80 was 50-100 (6).

Road building in mountain areas for forest management, timber harvesting, tourism and improvement of stock-farming has probably also adversely affected the Moulfon by destroying its habitat and by facilitating poaching (4,6,9,10). Similar threats apply to Corsica (2).

Competition for food in the Gennargentu area of Sardinia may also be a limiting factor, but this has not been studied (6).

CONSERVATION MEASURES

Adequate protection from poaching is the main need for Mouflon populations.

Italy: Since 1940 the Mouflon has been totally protected by law in Sardinia, but penalities for poachers have been very low in the past. In response to the new Regional Hunting Law (1978) penalities for Mouflon poachers were increased during the hunting season 1980/81 to 10,000,000 Lire (about $12,000). Possession of Mouflon trophies has to be reported to the Regional Faunistic Committee (6). The most important conservation areas in Sardinia are the two Regional Forests of Monte Arbu (2767 ha) and Montes (about 4600 ha) containing a Mouflon population of more than 450 individuals constituting some 33-41% of the total living in the original range. Hunting in the Regional Forests is strictly forbidden (Oasi Faunistica Permanente) and surveillance is carried out by well-trained forest guards. However, the number of guards is still insufficient to adequately protect the whole area (6) and recruitment of extra guards is desirable (4). Private game reserves exist, or existed, in the coastal range (Baunei, Urzulei), and in the Capo Figari area. This last one has unfortunately recently been abolished as a result of the Regional Hunting Law of 1978 and is actually without any legal protection; and poaching and predation by dogs was reported as being very frequent there in 1980 (6). There are also the three captive herds on the island, described above (6). Schenk has carried out a study of the status of this animal involving extensive fieldwork and critical evaluation of second hand records for the period 1971-1975 as well as a literature search (6,9).

France: Totally protected by law in Corsica (12) and the two most important herds, those of Bavella and Asco are well protected in reserves (13). Pfeffer made an extensive study of the animal in the 1960s, and smaller-scale studies have also been undertaken (2,20). A captive breeding herd occurs on the island. According to Schenk the whole range of the Corsican Mouflon is contained within the Corsican Regional Natural Park (6).

The Mouflon is listed in Appendix 3 of the 1979 Convention on the Conservation of European Wildlife and Natural Habitats, it is therefore to be protected, although exploitation is possible if the population level permits.

The species is also listed in Appendix 2 of the 1973 Convention on International Trade in Endangered Species of Wild Fauna and Flora, hence any trade in it or its products is subject to regulation and monitoring by ratifying nations.

REMARKS

There is much disagreement over the taxonomy of Mouflon. This account follows the classification by Pfeffer who describes the Mouflon of the Mediterranean Islands (Corsica, Sardinia and Cyprus) as the subspecies O. a. musimon (2). Other authors distinguish the Cyprus population as a separate subspecies (14). There is also debate over the taxonomy of the introduced populations; some authorities stating that

virtually all introduced populations are not pure-bred and are the results of crosses with other varieties of wild or domestic sheep (2,12,15). One herd, at least, that on the Miemo Private Reserve at Pisa, Italy, reported as numbering 1000 in 1971, is reputedly derived from pure-bred Sardinian stock (3). It is worth noting that there are clear morphological differences between the two remaining wild Corsican populations (2,15); and that some authorities consider the Mediterranean Mouflon to be originally derived from domestic stock returned to the wild state (17).

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List of Mammals *Possibly* Threatened in the EEC.

Species		Status
Erinaceus algirus	Algerian Hedgehog	K/NT
Neomys anomalus	Southern Water Shrew	K
Crocidura lasia		R/K
Talpa caeca	Mediterranean Mole	K
Lepus timidus	Mountain Hare	V/NT
Cricetus cricetus	Common Hamster	V/NT
Cricetulus migratorius	Grey Hamster	V/K
Spalax leucodon	Lesser Mole Rat	V/K
Acomys minous	Cretan Spiny Mouse	IK
Dryomys nitedula	Forest Dormouse	R/K
Hystrix cristata	Crested Porcupine	V/NT
Martes martes	Pine Marten	V/K
Vormela peregusna	Marbled Polecat	K
Genetta genetta	Genet	K
Felis silvestris	Wild Cat	V/NT
Capra aegagrus	Wild Goat	V/K

INSECTIVORA: ERINACEIDAE	Status:	EEC	World
Erinaceus algirus Lereboullet, 1842		K/NT	NT

E. Algerian Hedgehog or Vagrant Hedgehog
F. Herisson d'Afrique du Nord or Herisson d'Algerie
G. Wanderigel

DISTRIBUTION

EEC: France (1,2,3).

France: Occurs in the Département de Var, and possibly also the Pyrénées-Orientales. It may be present in other coastal Départements; as yet there is no confirmation whether it has extended its range to the Atlantic coastal regions south of the Loire (4). The first *E. algirus* specimen was captured in France in 1908 at Lecques in the Var (5), and since then the species has been recorded at many other localities, including ports such as Saint Cyr and Bormes (Département de Var) (6). Corbet (1966) and Saint Girons believe that *E. algirus* was undoubtedly introduced to Europe from Africa since it usually occurs in the vicinity of ports (3,6). Siépi emphasized the great amount of travel between the Balearics and the ports of Provence, and between Toulon and Bizerte in Tunisia (5). As for the Département des Pyrénées-Orientales, one of its main ports, Port Vendres, has close links with Oran and Casablanca in N. Africa. A specimen was found in La Rochelle in 1956 which also has frequent trade with ports in N. Africa (4). Heim de Balsac however considered *E. algirus* in France to be a Pliocene relic (7).

World: The Mediterranean and subdesert zones of north-west Africa from south-west Morocco to Libya. Also Fuerteventura and Tenerife (Canary Islands); Balearic Islands; Malta; and a few localities on the coast of Spain (1,3,4).

HABITAT

Predominately dry areas; in shrubs, hedges, copses, fringes of woods, rarely in closed woodland (8). It may possibly reproduce in France (2).

POPULATION

EEC: *France:* Saint Girons (1980) comments that its status is unknown (2).

World: Unknown but unlikely to be threatened.

THREATS

Unknown.

CONSERVATION MEASURES

EEC: *France:* Protected under Article 1 of the decree of the 25th November 1977; it is therefore forbidden to destroy, mutilate, capture or stuff the species (9). More information is needed about the status of this animal.

REMARKS

The generic name *Aethechinus* has been used instead of *Erinaceus* (7).

The Hedgehog on Corsica is probably *E. europeaus italicus* (4).

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INSECTIVORA: SORICIDAE	Status:	EEC	World
Neomys anomalus Cabrera, 1907		K	NT

E. Southern or Miller's Water Shrew
F. Musaraigne de Miller
G. Sumpfspitzmaus

DISTRIBUTION

EEC: Belgium, France, Federal Republic of Germany, Italy, Luxembourg and Greece (1,2).

Belgium: Has been recorded from widely scattered localities in the Ardennes (Luxembourg and Liège Provinces) (3,4,22). Has not been recorded west or north of the Meuse (3,22).

France: Saint Girons in 1973 recorded that it was only known from high altitudes in the Alps, Massif Central and Pyrénées, in the Départements of Ariège, Cantal, Haute-Garonne, Haute-Savoie and Puy-de-Dôme (21), although in 1976 it was reported from Gespunsart in the French Ardennes north-west of Charleville (4). Saint Girons observed that distribution was probably considerably more widespread than records implied as the species was rarely collected and easily confused with Neomys fodiens (21).

Federal Republic of Germany: Believed to be widely distributed in montane areas (5,6,7,25,26), though exact distribution is unknown as the species appears scarce and is rarely recorded (5).

Italy: Occurs on the mainland at least as far south as the Abruzzo National Park, though believed likely to also occur considerably further south (19).

Luxembourg: Has recently been recorded in owl pellets (3); exact distribution unknown.

Greece: Distribution unknown though has been reported from Mt Olympos in Thessaly and the River Pinios in Ilia in the Peloponnese (27).

World: Spain; western Europe; lowlands of eastern Europe east to Crimea and the River Don; perhaps western Asia Minor (2).

HABITAT

Generally marshy grasslands near water (1,3,7); in western Europe is usually regarded as a montane species though has been recorded as low as 190 m in the French Ardennes and in Eastern Europe is known to inhabit low-lying areas (2,4).

POPULATION

EEC: Very little is known about the status of this species but there is possible cause for concern.

Belgium: In 1980 considered by various authorities to be 'Rare' (9,10), or 'Insufficiently Known' (8).

France: In 1980 described by Saint Girons as 'Insufficiently Known' (11).

Federal Republic of Germany: Variously described as 'Rare' (5,6), 'Vulnerable' (12) and 'Endangered' (13). Listed as threatened with extinction in the German Red Data Book (14). Röben (1976) states that the population must be declining though there is not enough known of its distribution to provide factual information on the changes (16).

Italy: No recent information; described as 'Insufficiently Known' by various authorities (17,18,19).

Luxembourg: No information.

Greece: Described by Antipas in 1982 as 'Rare' (29).

World: Unlikely to be threatened.

THREATS

The clean water on which the Shrew depends is becoming increasingly scarce through drainage of habitat and increased sewage discharge or other water pollution (3,5,16,19).

CONSERVATION MEASURES

More research is needed into the distribution and status of this species; also preservation of the marshy grassland it inhabits and prevention of water pollution.

Belgium: No legal protection at present though in 1982 it was reported that legal protection in Wallonie (which includes the Ardennes) was imminent (3,8). Occurs in the Parc Naturel des Hautes Fagnes (3,8,23). Has been studied by Libois (3).

France: Not known.

Federal Republic of Germany: Protected by law BArtSchV of the 25th August 1980 (5). It has been studied by Niethammer (5), and Pieper (6).

Italy: Legally protected; known to occur in Gran Paradiso and Abruzzo National Parks (19).

Luxembourg: Totally protected by Règlement Grand-Ducal of 23rd November 1972 (20).

Greece: Protected by Presidential Decree (No. 67/1980).

Listed in Appendix 3 of the Convention on the Conservation of European Wildlife and Natural Habitats, it is therefore to be protected, although a certain exploitation is possible if the population level permits.

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INSECTIVORA: SORICIDAE	Status: EEC	World
Crocidura lasia Thomas, 1906	R/K	K

E.
F.
G.

DISTRIBUTION

EEC: Greece (1,2,3).

Greece: Confined to the island of Lesbos off the coast of Turkey in the Aegean (1,2).

World: Also occurs in north-east Asia Minor and Lebanon (3).

HABITAT

Reported to inhabit bushy undergrowth on Lesbos (2).

POPULATION

EEC: Greece: Unknown though in 1982 Ondrias reported it to be not common and Antipas described it as 'Rare' (2,4).

World: Unknown.

THREATS

Unknown.

CONSERVATION MEASURES

EEC: Greece: Not legally protected; there are no protected areas on Lesbos (2). Surveys of the species on Lesbos are recommended so that any necessary conservation measures can be taken.

REMARKS

There is no common name for this taxon which is sometimes considered a subspecies of Crocidura leucodon; the latter is widespread in Europe from France to the Volga (5). It has also been included in C. lasiura on occasion (1). Corbet however retains it as a separate species though has noted that the genus is in need of taxonomic revision (3).

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INSECTIVORA: TALPIDAE	Status:	EEC	World
Talpa caeca Savi, 1822		K	K

E. Mediterranean Mole or Blind Mole
F. Taupe Aveugle
G. Blindmaulwurf

DISTRIBUTION

EEC: France, Italy and Greece (1-7,16).

France: Distribution poorly known and controversial, confusion with *Talpa europaea* and *T. romana* making identification difficult. The only fully accepted French records appear to be a series of ten individuals collected by Grulich at Peira Cava in the Maritime Alps near the Italian Border in 1964 (1,8). However, Saint Girons has also stated that Moles captured at the Col du Bretolet in the Alps were likely to belong to this species and Heim de Balsac reported it from Gresse-en-Vercors at 1200 m in Isère in 1940, later also noting that it probably occurred in the Pyrénées Atlantiques, though this is unconfirmed (6,13,14). Saint Girons herself had not identified the species among Moles from the south-east or south-west of France (6).

Italy: Reported from scattered localities in the Alps and eastern (Adriatic) slopes of the Apennines as far south as the Gargano Peninsula and from a disjunct region in the south, Monte Pollino in Lucano (9). Has been reported sympatric with *Talpa europaea* and *T. romana* in some areas (11), although see below.

Greece: Reported to have a limited distribution in northern Greece (12,16). Ondrias in 1965 noted that it had only been recorded from Mt Olympos in Thessaly (16); more recent detailed information appears lacking.

World: Parts of Iberia, the southern side of the Alps, Balkans, Asia Minor and the Caucasus (1).

HABITAT

Found in a wide variety of habitats and soils from lowland to alpine zones (recorded at 1800 m), in deciduous or coniferous woodland, grassland and old pasture. It is often found in mountainous areas and in eastern Europe it is known from areas which may be covered in snow for three months of the year (15).

POPULATION

EEC: Unknown, but may be threatened.

France: 'Insufficiently Known' (6).

Italy: Described by various authorities as not threatened (3), 'Insufficiently Known' (4), or 'Rare' (5).

Greece: Ondrias in 1982 noted that it had been rarely recorded; he and Antipas considered its status to be 'Insufficently Known' (12,17).

World: Unknown.

THREATS

Grulich (15) has discussed the probable effects of human activity on the fragmentation of the species' distribution in Europe with forest clearance, soil erosion, impacting of soil by cattle and the disruptive effects on soil structure of cultivation all leading to large areas becoming unsuitable for it. He also considers that Talpa caeca has been displaced by competition with the stronger, more adaptable European Mole Talpa europaea which he believes to have been increasing its range southwards in the Mediterranean region in the last few thousand years. Talpa caeca is thus now taken to be confined to areas which T. europaea has been unable to colonize, through the presence of physical barriers, or to areas which do not satisfy the minimum habitat requirements of the latter. Talpa caeca is apparently less adaptable to cultivation than T. europaea and in particular the drying out of soils caused by intensive ploughing is believed to have led to its disappearance from many low-lying areas (15). Contoli has also suggested that the increasing use of insecticides in agriculture may constitute a threat (9).

CONSERVATION MEASURES

Investigations are needed to discover the status and distribution of this species.

Italy: Not legally protected (9); reported to occur in the Reserve of Punte Alberete (10).

France: Not known.

Greece: Reported to be legally protected (18).

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LAGOMORPHA: LEPORIDAE

	Status: EEC	World
Lepus timidus Linnaeus, 1758	V/NT	NT

E. Mountain, Arctic, Blue or Varying Hare
F. Lièvre Variable
G. Schneehase

DISTRIBUTION

EEC: Federal Republic of Germany, Italy, France, United Kingdom, Republic of Ireland (1,2).

Federal Republic of Germany: Has a very restricted distribution, being confined to parts of the Alpine area (in Bayern) above 1200 m (3,35).

France: Indigenous to the Alpine region where according to Ariagno in 1976 it was only found above 1600 m (34) (although Saint Girons reported it as occurring down to 1300 m, sometimes lower in winter (31)). It was widely distributed in the Alps above this, also being present in subalpine massifs in areas such as Vercors, Bauges and Aravis (34). It was present, though faring badly in the Diois and the south of the Drôme and possibly in the Grand-Chartreuse where Couturier had recorded it in 1964, though Ariagno stated that this record should be treated with caution as it had not been reported there since (34). Distribution at the beginning of the present century was said to have been much wider and authors writing even then had noted a marked contraction of range in prealpine areas (34). Saint Girons in 1980 reported that wild individuals had been introduced in the Pyrénées (4).

United Kingdom: Indigenous to the Scottish Highlands and Northern Ireland. It is widely distributed in the southern uplands in Dumfries and Galloway, the Borders and Strathclyde, and in the Grampian Mountains and Argyll, extending the whole length of the Mull of Kintyre (also presumed native on Arran); it is much more sparsely distributed in the North-west Highlands (5). Introduced, mainly during the 19th century, to various Scottish Islands (Shetland, Orkney, Outer Hebrides, Skye, Raasay, Scalpay, Eigg, Mull, Islay and Jura), the Scottish Lowlands, the Pennine areas of south Yorkshire and Derbyshire and north Wales near Bangor (7). The Provisional Atlas of the Mammals of the British Isles does not have post-1960 records for Wales (5), although Hewson in 1977 stated that a few Hares still survived there (4). Several of the introduced island populations are also extinct - the Atlas only recorded post-1960 records on Skye, Arran, Jura, Mull, Orkney and Shetland (5). Yalden in 1971 reported that the species' range in the Peak District appeared to be decreasing (6). Widespread in Northern Ireland, especially in the east (8).

Republic of Ireland: Widespread; present in every county, being found on lowlands as well as in hill areas (8).

Italy: The 'Censimento della fauna Italiana' published in 1981 reported the species to be still widely though generally sparsely distributed in the Alps and Pre-Alps, usually between 1600 and 3600 m, though sometimes descending as low as 1200 m in winter (37). For map see (37).

World: Tundra and coniferous forest zones from Scandinavia to east Siberia, south to about 50°N in European Russia and west Siberia and including

the mountains of central Asia south to the R. Ili in south-east Kazakhstan, the Altai, and Sikhote-Alin mountains. A widely isolated population in the Alps, and insular populations in Ireland, Scotland, Sakhalin and Hokkaido. Introduced to Spitzbergen in the 1930s, but apparently died out about 1954. In N. America confined to the tundra zone from Alaska to Labrador and Greenland, and on Newfoundland. In N. America it is replaced in the coniferous forest zone by L. americana whereas in Eurasia the replacement by L. europaeus occurs much further south (2).

HABITAT

Mainly in woods (seldom coniferous woods), and up to the snow line; in the Alps in the upper region; in winter descends to lower levels (1). In the Republic of Ireland, where the Brown Hare Lepus europaeus is absent, it also occurs in the lower and flat country (1,7,8). In Scotland occurs in heather moorland and the arctic/alpine zone (7).

POPULATION

EEC Although not threatened in the United Kingdom and Ireland, the Mountain Hare is threatened in much of the remainder of its EEC range.

Federal Republic of Germany: In 1980 described by various authorities as 'Rare' (9,10) and 'Vulnerable' (11,12). It is listed in the German Red List as potentially endangered (13). It is believed to occur at low population densities, though Röben in 1976 noted that it had a tendency to marked population fluctuations (3) and in 1980 remarked that it appeared relatively common in the Bechtesgeden National Park (36).

Italy: In 1980 it was noted that, although no actual figures were available, the species appeared to be slowly declining throughout much of its range and had been doing so at least since the beginning of the 20th century (37). In 1980 described as insufficiently known by some authorities (14,15), and as 'Rare' (16), or 'Vulnerable' (17) by others.

France: In 1980 described as 'Vulnerable' by Saint Girons (4), and Ariagno in 1976 noted in particular that it was doing badly in the Diois and southern Drôme regions (34).

United Kingdom: In 1980 described by various authorities as not threatened (18-25). In 1954 reported to be most numerous on grouse moors in north-east Scotland where heather management favours Hares (26). Watson and Hewson (1974) found that in west Scotland it was uncommon on arctic-alpine ground and even scarcer on low moors (27). In Northern Ireland, it was reported in 1981 that the species was generally considered to be decreasing, its numbers being said to be considerably lower than they had been five years previously; the large herds which had been charateristic of airports (Aldergrove c.426, Nutts Corner c.350, Sydenham c.50) no longer existed (33).

Republic of Ireland: Generally common and widespread (8), although is locally vulnerable in some areas (29). Uncommon on low moors in parts of C. Mayo in the west, according to Watson and Hewson (27).

World: Not threatened.

THREATS

In France and Italy there is strong hunting pressure (4,16). In the latter,

Spagnesi noted in 1981 that despite relatively strict controls on the hunting of the species it was still being overharvested in many areas. The effect of this was compounded by the increased level of disturbance and habitat disruption, mostly through tourism, in its range (37). In the United Kingdom it is killed in large numbers as a pest on heather moorland (7), although this is not believed to pose as yet a serious threat to the population. In the Republic of Ireland licensed, competitive coursing in enclosed fields ('enclosed' coursing) is reported to threaten the Hare locally (30). Schneider, talking specifically of the Federal Republic of Germany, has noted that competition with Lepus europaeus is a potential threat (and probably accounts for the limited, Alpine distribution of L. timidus in central Europe) and has also stressed the effects of increasing tourism and human disturbance on the Hare's habitat (35). It has been suggested that the decline in Northern Ireland may be connected with a recent increase in the Rabbit (Oryctolagus cuniculus) population; populations on islands in Upper Lough Erne, where Rabbits are absent, have been reportedly increasing (33).

CONSERVATION MEASURES

More information is needed about the status of the Mountain Hare in its continental range and if necessary appropriate conservation measures should be enacted.

Federal Republic of Germany: Covered by the game laws with a year-round closed season; occurs in the Bechtesgeden National Park (36).

France: Unknown, apart from introductions into the Pyrénées, which seem to have been effective (4).

Italy: The Mountain Hare is considered a game species; although there are relatively strict controls on harvest, these have apparently not been adequate to prevent declines in many areas. Spagnesi has suggested that all hunting should be banned in areas where the population is known to be decreasing and that in areas with a stable population, the harvest should be limited to no more than 25% of the previous autumn's numbers (37). Attempted introductions of animals from north European stocks are said to have taken place in 1980 in four Provinces (Imperia, Torino, Aosta, Vicenza) to try to replenish declining native populations; these do not appear to have been successful and Spagnesi has strongly advised against any further attempts (37). It is present in Gran Paradiso (62,000 ha) and Stelvio (93,500 ha) National Parks and possibly some other natural reserves (16,32).

United Kingdom: Not legally protected. Occurs in the Cairngorms and Caenlochan National Nature Reserves and many others (18).

Republic of Ireland: Included in the Wildlife Act, 1976 (30); a licence is required for coursing (28,30). Occurs in various reserves (28).

Listed on Appendix 3 of the 1979 Convention on the Conservation of European Wildlife and Natural Habitats, which requires that it is protected, although can be exploited if the population level permits.

REMARKS

There are three subspecies of Mountain Hare within the EEC: L. t. varronis in the Alps (a glacial relic (4)), L. t. hibernicus in Ireland, and L. t. scoticus in Scotland (2).

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RODENTIA: MURIDAE	Status:	EEC	World
Cricetus cricetus (Linnaeus, 1758)		V/NT	NT

E. Common Hamster
F. Grand Hamster
G. Feldhamster

DISTRIBUTION

EEC: Belgium, the Netherlands, the Federal Republic of Germany and France (1,2,3,4,5).

Belgium: Distribution has been mapped by Libois and Rosoux in 1982 (33). The Hamster occupied a limited range in the loess region in north-eastern Belgium in the Pays de Herve, in Hesbaye and the east of Brabant, this being effectively a westward continuation of the range in Limbourg in the Netherlands (33). Within this region recent (post 1969) records are relatively few and scattered (33), though Misonne has noted that the species seems to use the verges of the N3 motorway bewen Liège and Brussels as far west as Bertem (21); it was also reported in 1982 as having recently been found at Nivelles due south of Brussels (21). The Hamster expanded its range considerably in Belgium in the late 19th and first half of the 20th centuries, reaching its maximum extent in the 1950s (6,7,8,9,10,33).

The Netherlands: Isolated colonies are known to survive in Limburg, mainly in the south, having been reported in 1975-77 from near Mesch and Mheer on the southern border, south-east of Valkenburg and in two areas just west of Heerlen; recently some colonies have been found in central Limbourg and the species has been recorded as far north as Linne on the east bank of the Maas (11,22,31,32,34). Formerly much more widespread in southern Limburg (7). For map see (7,11).

Federal Republic of Germany: Said to occur in three disjunct areas: west of the Rhine between Köln and Bonn; along the Rhine valley south of Mainz and in the area around Hanover (2,8,13,14,15).

France: Restricted to the extreme north-east where it is found on the plain of Alsace and Lorraine, which is a continuation of its German range (5,16). For map see (5,16).

World: Occurs in the plains of central and eastern Europe from Belgium across to west Siberia, and north Kazakhstan as far as the upper Yenesei and the Altai in central Asia (1,16).

HABITAT

Primarily a species of the steppe, with a preference towards the wetter, wooded zone rather than the drier, subdesert zone (17). It has been able to extend its range westward as a result of forest destruction, and in EEC countries is mainly confined to loamy and loess soils. It has adapted well to traditional cultivation and is found in field margins and river banks as well as on grassland, and in the Federal Republic of Germany has been recorded in gardens in suburban areas (2,5,6,17,18,19,26).

POPULATION

EEC: Belgium: Now very rare and scattered; Libois and Rosoux in 1982 noted that the species had only been recorded in 25 localities since 1970 (33). In 1980 it was described by two authorities as 'Endangered' (6,20) and by one as 'Vulnerable' (21). In the early 20th century the species was extremely common in some areas and was an important agricultural pest; in 1910 over 20,000 individuals were killed in one agricultural commune (Fexhe-Slins) alone (33).

The Netherlands: Numbers regarded as very low (22) and in 1980 described by two authorities as 'Endangered' (22,23), and by others as 'Vulnerable' (24,25). Van Mourik and de Molenaar reported in 1978 that during the last few years the decrease had been so enormous that the Hamster was acutely threatened. However, a complete census is impossible because of the disruption caused by rapid harvesting of crops with immediate subsequent ploughing (11), and Pelzers in 1982 stated that the population in Middle Limbourg appeared to have been relatively stable for the last few years (34).

Federal Republic of Germany: Overall population unknown, though in 1980 was reported to be more or less common in the limited areas where it occurred (12,26). In 1980 two authorities described it as 'Vulnerable' (26,27), while others thought it not threatened (12,28). In 1976 Röben stated that its population seemed relatively stable and in some places was extraordinarily high; however since it was often subjected to poison campaigns to eradicate it, it should be rated a threatened species (4).

France: In 1980 described by Saint Girons as not threatened. Although it only occupied a small range it was locally very numerous; marked population fluctuation occurred and there appeared to have been a considerable increase in numbers in 1978. The species was apparently favoured by cultivation of maize (18).

World: No information, but unlikely to be threatened.

THREATS

With the introduction of modern agricultural methods (2,5,6,22) leading to the removal of verges, hedgerows, and the strips of grass dividing small fields, harvesting with combines (making it impossible to collect and store food for wintertime), deep ploughing immediately after the harvest and use of heavy machinery (both of which damage burrows), and crop rotation, the species has decreased enormously and even disappeared from many areas (2,11,22). Pelzers has noted, however, that in the Netherlands the species appears to be more threatened by land-use changes than by agricultural practices: in 1982 several colonies were reportedly threatened by industrial expansion, new motorways and housing developments (34). The species has also been considered an agricultural pest and in the past attempts were made to eradicate it wherever it occurred (22,26,33). Libois has stated that in Belgium trapping for taxidermy may now constitute an additional threat (30). In the Federal Republic of Germany gardeners destroy it because of damage to gardens (26).

CONSERVATION MEASURES

Although the Common Hamster is still apparently numerous in parts of

its range in the EEC (i.e. in France and the Federal Republic of Germany), its distribution is now very limited and experience in Belgium and the Netherlands has shown that the species does not appear to adapt well to intensive agricultural techniques in this part of its range and can undergo marked declines relatively rapidly; it is thus a cause of some concern. Smit and van Wijngaarden suggest the establishment of reserves where old-fashioned agricultural methods are maintained which would favour the species (2).

Belgium: Fully protected by law (31st October 1980) in the Flemish state of Belgium (i.e. the Provinces of Antwerpen, Limburg, West Vlaanderen, Oost-Vlaanderen, and the northern half of Brabant) (6). The species is not protected in Wallonia, though in 1982 it was reported that it may soon become so (30). Reported to occur in the Réserve Naturelle de la Montagne Saint Vierre near Vise (30).

The Netherlands: Totally protected by law (Besluit beschermde inheemse diersoorten) of 6 August 1973. Only marginally occurs in any reserves as no arable land is found within them (22). Surveys of the species were being carried out in 1981-82 by E. Pelzers in Limbourg (34).

Federal Republic of Germany: Protected by law (BArtSchV) of 25th August 1980.

France: Not protected.

Cricetus cricetus is listed in Appendix 2 of the 1979 Convention on the Conservation of European Wildlife and Natural Habitats. It is therefore designated a 'strictly protected fauna species' and is to be 'specially protected'. 'Each contracting party shall take appropriate and necessary legislative and administrative measures to ensure the special protection' of the Common Hamster. In particular the following are prohibited:
1) all forms of deliberate capture and keeping and deliberate killing;
2) deliberate damage to or destruction of breeding or resting sites;
3) deliberate disturbance, particularly during the period of breeding, rearing and hibernation;
4) possession of, and internal trade in these animals alive or dead, including stuffed specimens and any readily recognisable part or derivative thereof.

REMARKS

The Hamster is sometimes placed in the family Cricetidae (1,35), though this is often (as here) considered a subfamily (Cricetinae) of the Muridae (29).

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RODENTIA: MURIDAE

	Status: EEC	World
Cricetulus migratorius (Pallas, 1773).	V/K	NT

E. Grey Hamster
F. Hamster Migrateur
G. Zwerghamster

DISTRIBUTION

EEC: Greece (1,2,3).

Greece: Has been recorded intermittently and locally in southern Greece (Sterea Hellas and the Peloponnese) in the following areas: in Attica at Dekeli, Pentelikon, Kephissia, Kryonerion; near Lake Taka in Arcadia; in Korinthia at Agios Vasilios; at Thebes and Levadia in Boeotia (1). Ondrias considered that it was also likely to be distributed further north in Greece as it was known from eastern Bulgaria and European Turkey (1).

World: Steppes from southern European Russia, and marginally further south in Rumania, Bulgaria and Greece, through Kazakhstan to southern Mongolia and Sinkiang; it extends north as far as Moscow and south to Palestine, through most of Iran and central Afghanistan (2).

HABITAT

Generally dry, relatively open areas (steppe, open woodland, rocky areas and cultivated land); in Europe only found at low altitudes (0-300 m) (5).

POPULATION

EEC: Greece: Described by Ondrias in 1982 as a very rare species in Greece (6); Antipas in 1982 considered it 'Insufficiently Known' (3).

World: Very unlikely to be threatened.

THREATS

The species is believed to have been adversely affected by the increasing use of intensive agricultural methods (6).

CONSERVATION MEASURES

Greece: Protected by Presidential Decree (No. 67/1980) (4); not known to occur in any protected areas. Surveys are needed to establish the present range and status of the species in Greece to enable conservation plans to be drawn up.

REMARKS

The Grey Hamster is sometimes placed in the family Cricetidae, though this is often considered (as here) a subfamily (Cricetinae) of the Muridae (2,7,9).

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RODENTIA: SPALACIDAE	Status:	EEC	World
Spalax leucodon Nordmann, 1840		V/K	NT

E. Lesser Mole Rat
F. Spalax de Hongrie
G. Westblindmaus

DISTRIBUTION

EEC: Greece (1,2,3).

Greece: Has been mainly collected in eastern Greece, with scattered records in the north-east Peloponnese, Attica, Beotia, Phthiotis, Phocis, Thessaly, west Epirus, Macedonia and Thrace (1). In 1975 and 1976 it was also recorded further west, at Lefkothea and Eleousai in Ioannina, and is known to occur on the island of Limnos in the northern Aegean (1,7,8); in the early 1960s reference was also made to the species on Samothrace, Euboea and Lesbos (8). In 1982 range was said to have decreased notably in the past few decades, the species having disappeared from most of Attica and being considerably reduced elsewhere (see below)(8).

World: The Danube basin to Greece and south Ukraine; also the Caucasus through Asia Minor, north Iraq and Syria to Israel, and coastal Egypt west through Libya to Benghazi (2).

HABITAT

In Europe typically lowland and montane steppes in areas with maximum annual rainfall of 800 mm, characterized especially by *Stipa capillata*, *Chrysopogon gryllus* and *Andropogon ischaemum* (8). Also occurs on cultivated land; avoids marshes and wooded areas (8).

POPULATION

EEC: *Greece*: Ondrias in 1982 reported that numbers had been much reduced and the species now appeared confined to very small, isolated populations (6). Recorded as 'Indeterminate' by Antipas in 1982 (3). Savic and Soldatotivic in 1978 noted that the decrease appeared to have been particularly marked in north-east Greece where searches in 1975 and 1976 failed to find it although it had reportedly been common there in the 1920s (7).

World: Unknown; unlikely to be threatened, though populations in many areas are stated to be much reduced and in Hungary the species is regarded as threatened with extinction (7,8).

THREATS

The Mole Rat has reportedly been severely affected by the increasing intensity of land-use for agriculture (6). In northern Greece, for example, almost all low-lying areas are under intensive cultivation; those higher up are either tree-covered or bare rock, neither of which are suitable habitats (7).

CONSERVATION MEASURES

Greece: Not protected (4); it is not known to occur in any protected areas. Surveys of the species in Greece are required to enable any necessary conservation plans to be formulated.

REMARKS

The generic name *Microspalax* is sometimes used (8). The closely related *Spalax microphthalmus* has been reported as occurring in Greece, though this is now believed to have been in error (1).

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RODENTIA: GLIRIDAE	Status:	EEC	World
Dryomys nitedula (Pallas, 1779)		R/K	NT

E. Forest Dormouse
F. Lerotin
G. Baumschläfer

DISTRIBUTION

EEC: Italy, Federal Republic of Germany and Greece (1,5,6,9,10,15). For map see (6).

Italy: Recorded from two disjunct areas: the eastern Alps (Dolomitiche, Carniche, Giulie) and Calabria in the extreme south of the country (6,14).

Federal Republic of Germany: Occurs in the Fichtel Mountains and the Bayerisch-Böhmischen Forest (6).

Greece: Recorded from the Peloponnese through mainland Greece to the border with Yugoslavia. Ondrias in his 1966 study recorded it from the Peloponnese, Kryonerion, Attica, Krya Brysi, Metsovon, the Pindus Mountains and Epirus; previous records were from near Tatoi in Attica and Mt Parnassus in Phocis (15).

World: Widespread in deciduous woodland from the Balkans and Carpathians through European Russia as far north as Moscow and south to the Caucasus, Asia Minor and N. Iran. Its peripheral distribution is probably very fragmented and is mainly in montane forest: in the eastern Alps, in Calabria, Palestine, central Iran, Afghanistan, much of Russian Turkestan to the extreme end of the Tien Shan in Sinkiang (6,9).

HABITAT

In Europe rather strictly confined to deciduous woodland especially where there is a thick shrub layer, e.g. of Hazel; occurs as high as 1500-1600 m in the Alps (6,10).

POPULATION

EEC: Numbers unknown, though occupies a limited range within the EEC and some concern has been expressed regarding its status.

Italy: In 1980 described by Cagnolaro and the Unione Italiana per la Protezione della Natura as 'Rare' (2,3) and by Boitani and Contoli as possibly threatened, but information lacking (4,14).

Federal Republic of Germany: Listed in the German Red Data Book as threatened with extinction (7); regarded by other authorities as 'Endangered' (11,12) or 'Rare' (13). Few specimens have been recorded (13).

Greece: Recorded by Antipas in 1982 as 'Indeterminate' (17); Ondrias has noted that although it is not common, it is not excessively rare (16).

World: Unknown, but unlikely to be threatened.

THREATS

Contoli has mentioned that burning and clearance of woodland in Italy (especially in Calabria) constitutes a possible threat although large areas of apparently suitable habitat still occur (14). No threats have been specified for West Germany or Greece.

CONSERVATION MEASURES

Investigations are required to determine the necessary conservation measures to ensure the survival of this species in the EEC.

Federal Republic of Germany: Specifically protected by law (BArtSchV) of August 25th, 1980. The Bayerischer Wald National Park is within the species' range in Bavaria, and habitat in the Fichtel Mountains is believed secure at present (13).

Italy: Legally protected; thought likely to occur in some regional parks and natural reserves in Trentino and Friuli-Venezia Giulia. It is also known to occur in the area of the Calabria National Park; this park has been gazetted though little has yet (1982) been done to protect the area and develop management plans.

Greece: Protected by Presidential Decree (No. 67/1980). Not known to occur in reserves or protected areas (16).

All Gliridae are listed in Appendix 3 of the 1979 Convention on the Conservation of European Wildlife and Natural Habitats, they are therefore to be protected, although a certain exploitation is possible if the population level permits.

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RODENTIA: MURIDAE	Status:	EEC	World
Acomys minous Bate, 1906		K	K

E. Cretan Spiny Mouse
F. Rat Epineux de Crète
G. Kreta-Stachelmaus

DISTRIBUTION

EEC: Greece (1,2,3,6,7).

Greece: Confined to Crete and a few islands off the Cretan coast. On Crete has been recorded in low-lying areas up to 550 m, mostly in coastal regions but also on inland plains (1,2,5,6,7).

World: Endemic to Crete.

HABITAT

Preferred habitat is typical Mediterranean low bush vegetation usually in rocky, broken terrain, often on limestone hills; south-facing sites are especially favoured (7). It also readily enters houses and gardens, especially in winter (1,5,7).

POPULATION

EEC: *Greece*: Not known; described as 'Insufficiently Known' by Antipas in 1982 (3).

World: As above.

THREATS

Unknown.

CONSERVATION MEASURES

Greece: Not legally protected (4); it is not known to occur in any reserves or protected areas.

REMARKS

Classification within the genus *Acomys* is very problematic. *Acomys minous* is included within a complex of closely related forms which have been considered a single species, *Acomys cahirinus*, distributed through much of East Africa, semi-desert north Africa, Cyprus, Crete, much of Arabia and eastward through southern Iran to Sind (2). It is now, however, generally treated as a distinct species endemic to Crete (1,5).

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RODENTIA: HYSTRICIDAE Status: EEC World

Hystrix cristata Linnaeus, 1758 V/NT NT

E. Crested Porcupine
F. Porc Epic
G. Stachelschwein

DISTRIBUTION

EEC: Italy (1-6,9,10).

Reference has occasionally been made to the presence of the species in a limited area of northern Greece (and adjacent Albania and Yugoslavia) as a result of recent introductions, though this has remained unverified and is considered doubtful by most authorities (1,2,4,10).

Italy: Has a fairly wide though not uniform distribution on the Italian mainland (6). West of the Apennines, it extends as far north as Pisa, i.e. in Tuscany, Umbria, Latium, Campania, and Calabria. In the south it is also found in Basilicata and south of Bari and on the Gargano peninsula in Puglia (6). It is widely distributed in Sicily (6). For map see (6). It has recently been reported as extending its range northward and eastward, particularly in Tuscany north of the River Arno (6). Fossil Hystrix are recorded in Europe from the Pleistocene (7), but many authors consider the extant Italian population to be a result of introductions by the Romans (3,6).

World: North Africa (Morocco to Libya and possibly Egypt), south of the Sahara in the steppe and savanna zones from Senegal to Ethiopia and N. Tanzania (1,2).

HABITAT

In the region of the River Arno in Tuscany, where the species has been studied, favoured habitats are hilly areas of mixed cultivation, interspersed with woodland and deep gorges, on tufaceous soils which are ideal for burrowing (6). It is also capable of adapting to a wide range of environments such as coastal woodland and bush and open cultivated plains where it burrows along river and canal banks if there is sufficient cover (6). In Italy it is reportedly found up to 1000 m (9).

POPULATION

EEC: Italy: Total numbers unknown; in central Italy the species is generally agreed to be increasing in numbers and expanding its range, particularly in Tuscany, where Santini found it to be especially abundant in the hills of the Arno and its tributaries in his study from 1976 to 1979 (6,9). It is also said to be abundant on the Gargano Peninsula (6,9). In the south and on Sicily, Scaramella in 1981 reported it to be generally declining and noted that it seemed to have disappeared from many areas of previous occurrence (9). However Santini in 1980 considered that the species was still locally abundant on Sicily and frequent in other areas such as Puglia and Basilicata (6).

THREATS

Despite legal protection, the Crested Porcupine has been extensively hunted and poisoned especially in the south and on Sicily (4,6,9). It is considered a great delicacy and the spines are used for jewellery and other ornaments (9). It is also held to be a pest of agricultural crops and orchards (4,6). The amount of damage caused by the animal is controversial, though in central Italy it is said to particularly affect crops of maize, potatoes and chick-peas (6,9). Scaramella has also stated that habitat destruction, particularly clearance of Macchia scrub, is a contributory factor in its decline in the south (9).

CONSERVATION MEASURES

Italy: Afforded legal protection in 1974 (6). In view of the Crested Porcupine's position as a species often considered threatened in Italy (4,5) but which is also a potential pest (see Threats), a study programme was launched in 1976 to determine its status, distribution and ecology and to formulate management policies (6); a principal recommendation resulting from this is live translocation of surplus individuals from areas where they are a problem to more suitable sites, and in 1980 it was reported that studies were under way to determine the best techniques (6).

Listed in Appendix 2 of the 1979 Convention on the Conservation of European Wildlife and Natural Habitats. It is therefore designated a 'strictly protected fauna species' and is to be 'specially protected'. 'Each contracting party shall take appropriate and necessary legislative and administrative measures to ensure the special protection' of the Crested Porcupine. In particular the following are prohibited:
1) all forms of deliberate capture and keeping and deliberate killing;
2) deliberate damage to or destruction of breeding or resting sites;
3) deliberate disturbance, particularly during the period of breeding, rearing and hibernation;
4) possession of, and internal trade in these animals alive or dead, including stuffed specimens and any readily recognisable part or derivative thereof.

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CARNIVORA: MUSTELIDAE	Status:	EEC	World
Martes martes (Linnaeus, 1758)		V/K	NT

E. Pine Marten
F. Martres des Pins
G. Baummarder

DISTRIBUTION

EEC: Belgium, Denmark, Federal Republic of Germany, the Netherlands, United Kingdom, Republic of Ireland, Luxembourg, France, Italy and Greece (1-17,57).

Belgium: Present in Gaume, Ardennes, and the Fagne-Famenne valley; elsewhere small populations occur in various wooded regions: Fouron Commune, Dave Wood south-east of Namur, Tihange Wood south of Huy and in Flanders in Pine woods north of Campine (3). In 1971 it was reported absent from southern Limburg and near the German border (3,4). There have been recent sightings in northern Belgium: in 1981 a road kill was recorded at Kleine Brogel and in 1980 small numbers were observed at Voeren near the border with the Netherlands; one was seen in 1973 at Lommel near the border with the Netherlands; one shot in 1971 at Postel, near Lommel; one seen in 1971 and two seen in 1969 at Kalmthout, north of Antwerp (18). The Pine Marten's range in Belgium has scarcely altered in over a century (3).

Denmark: Distribution was mapped in 1977 (52). On Jylland the largest numbers occurred in the south with scattered populations of varying size in the east and centre; the species was absent or very low in numbers in most of the west and was thought unlikely to exist north of the Limfiord (52). On Funen and Lolland-Falster a few small populations occurred and there were fairly large populations in forests in central Sjaelland. It was also occasionally reported outside these areas. In general it was found in the same regions it had occupied during the 1930s and 1940s (52).

Federal Republic of Germany: Widely distributed; said to be generally found wherever there are large bodies of coniferous woodland (56).

The Netherlands: Distribution was mapped in the late 1960s (4,5,6): the species was found to be fairly widely though patchily distributed in forested areas in eastern Provinces of the Netherlands, especially in southern Limburg, in Overijssel along the border with Germany and in the Veluwe in western Gelderland, with scattered populations elsewhere in these three Provinces. Small areas of distribution were also recorded in eastern Utrecht (near Doorn), Noord Brabant (north of Eindhoven and north-west of Venraij) and in Drente south-west of Groningen (4,5,6) In 1981 the species was also reported in Friesland and Groningen Provinces though its occurrence in Utrecht since 1979 remained unconfirmed (51)). There are numerous scattered old records in southern Friesland, Drente, Noord Brabant and eastern Utrecht (4,5,6).

United Kingdom: Now mainly restricted to the Scottish Highlands, (especially north-west of the Great Glen, which is still its principal area of distribution in the U.K.), southern Lake District, Peak District, Wales (mainly Gwynedd, but also the Brecon Beacons) and Northern Ireland

(7,8). In 1982 it was reported that the Forestry Commission had recently reintroduced the species into south-west Scotland (42). Scattered records elsewhere (Cheviots, north Yorkshire, Ayrshire) may represent overlooked remnants of the former range or be recent colonizations or undocumented introductions (8). In Northern Ireland its presence was reported in 1980 in five out of the six counties (54). Formerly widespread on mainland Britain and on some coastal islands, by the end of the 19th century the range had drastically contracted as a result of intense persecution and extensive deforestation, though by the 1920s it had begun to expand again, in Scotland at least (8,9).

Republic of Ireland: Much of the Republic was surveyed for Pine Martens in 1978-1980. The species was mainly distributed west of the Shannon River, being recorded in all counties here (Clare, Galway, Leitrim, Mayo, Roscommon and Sligo), especially in Clare, southern and west-central Galway, central Mayo and eastern Sligo (46). Outside this area, it was widely distributed in the Slieve Bloom Mountains on the Laois-Offaly border and was recorded from one 10 km square in Cork and Kerry, two in eastern Waterford and two near Drogheda in Meath (46); the species was not recorded from other areas, such as the Wicklow Mountains, where there are several old, unverified records (10,46).

Luxembourg: Reportedly present throughout the country (19).

France: In 1982 said to be widely though thinly distributed in France where suitable habitat remains (58). Saint Girons has stated that the species is becoming much scarcer in certain regions, particularly in areas where monoculture predominates, although it may be expanding its range in areas of Pine reforestation schemes (20). Present on Corsica (2,11).

Italy: Little detailed information; is reported to have a wide though very patchy distribution on the mainland, and to occur on Sicily and Sardinia (45,50). A semi-quantitative census of carnivores in Italy from 1973 to 1976, using forest rangers' reports from 1003 communes found the Marten to be present in at least some areas of all the Regions of Italy (50). It was however reported absent from over half (552) of the communes involved (50). On Sardinia, Hutterer and Geraets in 1978 reported it to be widely scattered in montane regions (53).

Greece: Reported to be scattered in mountainous regions in the north (57).

World: Forests throughout most of Europe except southern Iberia and Greece, east to about 80°E in west Siberia; the islands of Ireland, Britain, Sardinia, Corsica and Sicily; the Caucasian region, Elburz Mountains and north-east Asia Minor (2).

HABITAT

Primarily an inhabitant of woodland, although in some parts of Ireland and Scotland it may live on open, rocky hillsides and sea-cliffs (3,6,8,9,15,17).

POPULATION

EEC: Occurs in all ten countries of the EEC and in seven of them various authorities have considered it threatened. More information is needed on its status.

Belgium: Opinions vary as to its status: in 1980 D'Huart and Libois stated that insufficient was known (21); Libois found that foresters regarded it as rare or uncommon (3), though he considered the population to be stable (22); Van der Straeten described it as 'Endangered', and certainly declining in the Flemish part of the country (18); and Misonne regarded its status as 'Vulnerable' (23).

Denmark In 1977 Degn and Jensen noted that it was an uncommon species and was likely to remain so, though they stated the population probably constituted 'some thousand' (52). It had certainly increased in numbers since the 1930s and 1940s when it was estimated that only 150 litters were produced each year, though the reasons for this increase were not clear (52). An accurate census was not possible as the species was only rarely recorded and often confused with the Stone Marten (Martes foina) (52).

Federal Republic of Germany: In 1980 described by various authorities as not threatened (26,27), 'Rare' (28) or 'Vulnerable' (29). Generally noted as rather rare, the population appearing to be only about one-fifth that of the Stone Marten and probably decreasing (27,56). It is, however, difficult to observe and often confused with the Stone Marten (56). However it was not listed in the German 'Red List' (30) and Röben stated that from the hunting records the Pine Marten appeared not threatened as it was rarely hunted (59); there was, however, an absence of numerical data (12).

The Netherlands: In 1980 described by various authorities as 'Rare' (31), 'Endangered' (32), or 'Vulnerable' (33,34). There are said to be indications of a decrease in numbers (32), though these are reportedly based on general impressions rather than detailed field data (51).

United Kingdom: In 1980 opinions varied as to its status (35-41) though some authorities regarded it as threatened (39,40). The Scottish Wildlife Trust stated it was 'Rare' in Scotland (42), though its has been reported as locally abundant (43,60). It is said to be very rare in England and Wales (43,60). At the beginning of the present century Pine Martens had decreased drastically in range and numbers, in Scotland being confined to a few patches on the western coast of the North-west Highlands (8,9). Around 1926 they began a noticeable increase which continued for at least 20 years (9). At present, numbers are probably increasing overall although there have been local declines and even extinctions (43).

Republic of Ireland: Fairley (1975) described it as the rarest of all Irish mammals, although it seemed common in a few districts, notably in the west and particularly in Clare (13).

Luxembourg: Considered not threatened in 1980 (19).

France: Virtually nothing is known of population estimates or density (58). In 1980 Saint Girons described it as not strictly speaking a rare animal though she has stated it was not common (20); in some regions numbers are said to have increased (44) and it is not believed to be very much hunted (58).

Italy: Numbers unknown, though belived to be almost certainly decreasing; populations are generally very small and more or less isolated

(45). The survey in 1973-76 recorded it as 'common' in only 22 of the 103 communes covered, though it was apparently present in 'reasonable numbers' in a further 218, it being considered rare in the other 312 in which it was recorded (50). In 1978, Hutterer and Geraets reported that it occurred at notably high density in the Gallura region in northern Sardinia (53).

Greece: Population and trends unknown though described by Antipas in 1982 as rare (60).

World: Not threatened.

THREATS

Decline was caused by deforestation and persecution by fur trappers, sportsmen and gamekeepers. These threats are still relevant, although the latter may be less common than previously in some countries (e.g. the United Kingdom). Accidental poisoning by bait left for foxes, other mustelids and rooks is also a problem (3,8,9,17,20,32,43,45,50).

CONSERVATION MEASURES

EEC: More information is needed about the status of this species within the EEC.

Belgium: Not fully protected, but comes under the hunting laws (3,18,22) where the closed season is decided yearly and has recently continued throughout the year (3). However, the use of poison and traps continues and may kill Pine Martens (22), although since the 1981-82 hunting season the use of poison bait and traps is no longer allowed in the Flemish part of the country (18). Occurs in many reserves including the Réserve Naturelle Domaniale des Anciennes Troufferies de Libin (22). Removal from the game law and total protection under a nature conservation law are needed to conserve the species. A national campaign for the protection of wild small carnivores has been launched, by the association 'Jeunes et Nauture' and, in the Flemish region, by De Wielewaalsongeren (18), which has disseminated large amounts of educational material, including posters, leaflets and stickers (55).

Denmark: Totally protected by law since 1934 (52); not known to occur in any reserves (24).

Federal Republic of Germany: Not fully protected though is covered by game laws (i.e with a limited open season) (59).

The Netherlands: Fully protected under the hunting law (Jachtwet) of 3 November, 1954 and occurs within reserves where management plans include, where relevant, conservation measures for this species (31,51).

United Kingdom: Not legally protected. It occurs in Beinn Eighe Nature Reserve and Glen Affric Forestry Commission areas and other reserves where it is protected. Reforestation has been a factor in its recent increase (9). Surveys of distribution were being carried out during 1980-82 in Scotland by Dr. K.A. Velander (43).

Republic of Ireland: Specially protected under the Wildlife Act of 1976; licences are thus needed for any activity relating to this animal, including control in the event of damage to property (46). It occurs in

reserves (47). Studies on the Pine Marten by the Department of Fisheries and Forestry were in progress in 1980 and were intended to provide information on distribution, population density and dynamics (46).

Luxembourg: Protected by hunting regulations, the open season being annually reviewed (19). In 1980 the ministerial regulation limited the hunting period to 3.5 months, from 15th October to 28th February (48).

France: Protected under article 2 of the decree of 25 November 1977: it can be killed for control purposes etc., but not hunted (49).

Italy: Completely protected and known to occur in some reserves and in Paradiso, Stelvio, Abruzzo and perhaps Calabria National Parks (45).

Greece: Protected by Presidential Decree (No. 67/1980).

The Pine Marten is listed in Appendix 3 of the 1979 Convention on the Conservation of European Wildlife and Natural Habitats, it is therefore to be protected although a certain exploitation is possible if the population level permits.

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CARNIVORA: MUSTELIDAE

	Status: EEC	World
Vormela peregusna (Guldenstaedt, 1770)	K	NT

E. Marbled Polecat
F. Putois Marbré
G. Tigeriltis

DISTRIBUTION

EEC: Greece (1,3,5).

Greece: Reported to occur in Thrace and Macedonia though exact distribution unknown (1,5).

World: Steppe and subdesert zones from south-east Europe to western China, south to Palestine and Baluchistan (2).

HABITAT

Dry grassland, scrub and open woodland (3,7).

POPULATION

EEC: Greece: Unknown; Antipas in 1982 described its status as 'Insufficiently Known' (4). Has been stated to be very much on the decline in Europe (7).

World: Unknown; unlikely to be globally threatened though is listed in the Red Data Book of the U.S.S.R. (6).

THREATS

None specified.

CONSERVATION MEASURES

Greece: Not protected or known to occur in any protected areas. Surveys of this species in Greece are recommended to determine its status and allow any necessary conservation plans to be formulated.

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CARNIVORA: VIVERRIDAE

	Status:	EEC	World
Genetta genetta (Linnaeus, 1758)		K	NT

E. Genet
F. Genette Commune or Genette Vulgaire
G. Kleinfleck - Ginsterkatze

DISTRIBUTION

EEC: France (1-7).

Genets have occasionally been reported from the Netherlands, the Federal Republic of Germany, Belgium and, recently, Italy where two observations were made in the Valle d'Aosta in 1981. It is thought highly probable that most, if not all, are escapes or artificial introductions, though some (e.g. in Belgium and the Eifel Region in the Federal Republic of Germany) could conceivably be wandering wild individuals (2,10,11,12). There is, however, no evidence of any permanent populations in these countries.

France: A detailed review by Schauenberg was published in 1966; the Genet was largely confined to the area south of the Loire and west of the Rhône with at least some records from all Départements in this area (2). There were numerous individual extralimital records; those a considerable distance away (e.g. in Aisne and Bas-Rhin) were thought most likely to be escapes or releases from captivity while at least some of those on the borders of the range (e.g. at Eygalières in Bouches-du-Rhône in 1965 and at Boulaye in Saône-et-Loire in 1961) were thought to be errant or dispersing individuals (mostly males) (2). Schauenberg considered that these implied the species was expanding its range north and eastwards but the frequency of such vagrants did not appear to have markedly increased since the previous century and there appeared to be thus no real evidence of an increase in range, at least on this time-scale. For map see (2). Roeder in 1982 observed that the range appeared more or less unchanged since Schauenberg's review (13).

World: Also occurs in the Iberian peninsula, Mallorca, Palestine, south-west Arabia, north Africa from Morocco to Cyrenaica, and the savannah zones of Africa south of the Sahara (1). Populations south of the Sahara are sometimes considered a separate species, Genetta felina (15).

HABITAT

The species is highly adaptable and occurs in a wide variety of habitats, though is generally found at higher density in areas with a milder microclimate. It is often found in close proximity with man and is known to raid chicken runs (13).

POPULATION

EEC: France: Pfeffer in 1980 reported it to be still relatively common in the south-west while Saint Girons considered its status 'Indeterminate' (3,5). Roeder in 1982 reported that there appeared to have been a general increase in numbers over the past few years although accurate quantitative information was virtually impossible to obtain (13). Schauenberg in 1966 noted it as at least locally common in the following

Départements: Vendée and Deux-Sèvres in the west (following Brosset (7)); Gard, Tarn, Aveyron, Lozère, Dordogne and Lot in south-central France (mostly the southern Massif Central); Creuse in the northern Massif Central; the Basses-Pyrénées and Pyrénées-Orientales in the extreme south. It was additionally reported regularly in Vienne, Hautes-Pyrénées, Haute-Garonne, Gers, Hérault, Charente-Maritime, Corrèze, Cantal, Indre, Loire-Atlantique and Lot-et-Garonne. Elsewhere it was only rarely recorded (2).

World: Not threatened.

THREATS

Although the species does not appear to be shot particularly often, considerable numbers are believed to be trapped in winter for their pelts which are highly esteemed. Schauenberg in 1966 noted that Genet pelts were exceeded in value only by those of the Marten (*Martes martes*) and Otter (*Lutra lutra*) (2). He believed the annual killing rate to be 250-500 (2), though in 1982 Roeder noted that it was very difficult to make any accurate estimate (13).

CONSERVATION MEASURES

France: Totally protected by law (3,4) although trapping is still carried out (see above). Some studies in captivity and in the wild were being carried out in 1982 (13).

The Genet is listed in Appendix 3 of the 1979 Convention on the Conservation of European Wildlife and Natural Habitats, and is therefore to be protected although exploitation is possible if the population level permits.

REMARKS

There are no records of Genets in France prior to the 8th century, nor are there any recorded in Quaternary deposits; one theory is that they were an introduction by the Saracens (6).

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CARNIVORA: FELIDAE	Status:	EEC	World
Felis silvestris Schreber, 1777		V/NT	NT

E. Wild Cat
F. Chat Sauvage
G. Wildkatze

DISTRIBUTION

EEC: Belgium, France, Italy, the Federal Republic of Germany, Luxembourg, the United Kingdom and Greece (1-16).

Belgium: The Wild Cat has been increasing its range since the 1950s. Parent, in an enquiry from 1967 to 1971, found it present in: the Provinces of Luxembourg - in wooded areas of Lorraine and in the south and central Ardennes; in Namur in the Entre-Sambre-et-Meuse region; and in Liège in the Hautes-Fagnes area (3). The last population is derived from the Federal Republic of Germany, where the species is increasing, and was spreading south and west into the Ardennes, as far as Tintange and the Forêt d'Anlier in the south. The others appear to be mainly derived from eastern France, the movement occurring on a wide front from the French Lorraine as far as the area bordering Namur. These populations were reported in 1978 as appearing about to mix in the central Ardennes (3). The Wild Cat is well documented in Luxembourg, Liège and Namur Provinces during the 19th century but then virtually disappeared from most areas, though scattered records persisted. It appears to have died out in the Ardennes around 1900 but survived in the Lorraine at least until 1930 (3); it was then definitely recorded again in the Lorraine from 1945 onwards (in the Côte Bajocienne) and was probably never absent from the Chiers sector in the extreme south. It then spread to the southern Ardennes in the early 1960s with very marked increases in population and northward expansion of its range noted from 1966 onwards (3).

France: Mainly occurs in the northern part of the Massif Central north-eastwards, though also occurs in the Rhône-Alpes region, where Ariagno noted in 1976 that it was probably more widely distributed than usually thought and appeared to be spreading southwards, at least locally; in 1980 it was also reported to be extending its range in eastern France. It has been recorded from the Départements of Allier, Ain, Isère, Drôme, Ardèche, Hautes-Alpes, Côte d'Or, Jura, Marne, Haute-Marne, Meurthe-et-Moselle, Meuse, Moselle, Nièvre, Bas-Rhin, Haute-Saône, Saône-et-Loire, Vosges and Yonne (5,12,17,49,51). Saint Girons in 1973 additionally noted its recent capture in Normandy (where Rode and Didier had stated in 1940 that it did not occur (44)), but stated that its presence in Brittany was doubtful (50); Berille and Noblet noted in 1980 that it was not known whether individuals from Normandy represented wild populations or introductions (51). It also occurs in the Pyrénées-Orientales, Basses-Pyrénées and on Corsica (17). In 1982 it was reported that the species had recently been reintroduced to the Département of Haute-Savoie, the animals having originated in the Côte d'Or (54).

Italy: An inquiry into the distribution of the Wild Cat was conducted from 1971 to 1973 using the State Forestry Guards' Headquarters, the

Hunter Associations, the Provincial Hunting Committees and many private individuals (18,19,46). Ragni has updated and reviewed the findings of the inquiry (46,60). For map see (60). The Wild Cat was recorded as relatively widely distributed in southern Tuscania and conitiguous north-western Umbria and along the Apennines from around Perugia south into Calabria as far as Aspromonte. It was also recorded on the Gargano Peninsula. In the north it was known to definitely occur only in the Karst region around Trieste in Friuli-Venezia Giulia and in Imperia and western Savona in the extreme west. Possible occurrence in a small area just north of Lago Maggiore in northern Piemonte does not appear to have been subsequently confirmed (46,60). On Sicily it was recorded as present in the mountains of Etna, Nebrodi and Madonie extending westwards to south of Palermo. In Sardinia it was reportedly widely distributed along the mountains in the eastern half, also occurring in the Iglesiente region in the south-west, in the extreme north-west (west of Sassari) and the region around Cuglierio on the west coast (46). The range has been said to be considerably reduced, especially in northern Italy, (18,19), although Ragni noted in 1980 that there are great difficulties involved in establishing former range (46). He did however consider that the distribution on the peninsula mainland and on Sicily and Sardinia was probably relatively unchanged though there may have been some reduction in suitable habitat in the past three of four decades (46). He considered there was insufficient evidence to state whether the range in the Alpine areas had drastically declined or not (46).

Federal Republic of Germany: By 1982 Wild Cat populations were recorded in Rheinland Pfalz (the Palatine Forest, the Donnersberg, the Hunsrück mountains, the Eifel Mountains and some areas between these); in Hessen (the Taunus Mountains and eastern Hessen); in Nordrhein-Westfalen (northern Eifel); Niedersachsen (the Harz Mountains); Baden-Württemberg (south-east parts of the Schwarzwald and probably further north in this region) and Bayern (21,42,45). In Bayern (Bavaria), it notably occurred in the eastern forests along the borders with the German Democratic Republic and Czechoslovakia, primarily the Bayerisch-Böhmischen Forests, with a few individuals in the Fichtelgebirge and Franconian Forest (42). The population in the Bayerish-Böhmischen Forest was replenished by individuals from Czechoslovakia (42). The species was reported in 1982 as having recently appeared in the Stromberg region north-west of Stuttgart in Baden-Württemberg (21). In northern Bayern small populations established in the last ten years were found in the Spessart and the Rhön and there were a very few unconfirmed but probable reports for the Altmühltal in central Bayern; in 1982 it was also noted as recently recorded in the northern Schwäbische Alb and in the Frankenhölme north of this (42). Formerly the species was widespread but disappeared from many areas particularly during the second half of the 19th Century, and by the 1930s only survived in a few mountainous regions - Eifel, Hunsrück and Pfälzer Wald (Palatine Forest), western Taunus, Harz, Kaufunger Wald, and probably the Meissner region (9,21). Since then numbers have increased and its range is expanding (9,14,15,16). It is apparently absent from the north German plains where it could be found in the early part of this century (21).

Luxembourg: Parent in 1976 noted that several Wild Cats were killed in 1970 in the vicinity of Oberfeulen and one had been shot in 1972 north of Differdange, in an area which was an extension of the Côte Bajocienne woodland into Luxembourg (11). As a result of these he suggested that

the country was effectively being colonized from at least three different directions: from the Côte Bajocienne in the south-west; along the Sûre Valley, these animals being considered to come from the Anlier Forest; from the Eifel region in the north-west, individuals having been especially noticed on the German side of the Our valley (11).

United Kingdom: Now confined to the Scottish Highlands, having become extinct in England and Wales by the end of the 19th century (6). In Scotland it occurs north of about 55° 30' N (23). By 1875 it had virtually disappeared from all areas south of the Great Glen; however after World War I it began to increase in numbers and to extend its range. It was re-established in Argyll, Perth and West Aberdeenshire by 1946, and in Moray, Nairn and Angus by 1960 (6). In the late 1960s and 1970s there have been records from south of the Highland boundary, and the species is probably spreading southward (6). For map see (23).

Greece: Known to occur on the mainland and on Crete (56) although no details located.

World: Woodland, savanna and steppe zones from W. Europe to W. China and central India, and throughout these zones of Africa. In Europe it does not reach the northern limit of the deciduous woodland and is now largely confined, because of persecution, to isolated areas of montane, and often coniferous, forest. There is probably also a considerable amount of fragmentation of the range in the Arabian region and in central Asia since it avoids desert. Occurs on all the main Mediterranean islands (2). Does not occur in Ireland.

HABITAT

The species occupies, or has been recorded from, a wide variety of habitats although preferred habitat has been stated to be forest, especially (in Britain) dense, young forest with broom and gorse scrub association (6,24,25,42,46); Ragni noted that Wild Cats in Italy prefer to hunt in the open (meadows, fields, open wood, grassy scarps, wood edges, wood clearances etc.) but have wooded areas as territories for shelter, rest, breeding and partially for hunting; preferred habitat was deciduous hardwoods or mixed woodland with the ecological optimun mixed Oak and Beech stands from 400 to 1600 m in altitude, although it is found at sea-level (e.g. at Maremma) and as high as 1800 m (in the Alps) (46). In Scotland it is mainly found below 500 m, frequenting grouse moors and hill ground as well as forested areas (6,25). Its association with mountainous or hilly areas is believed to be a result of past persecution in low-lying areas rather than to be actual habitat preference. Keil noted that in Germany Wild Cats were slowly spreading into a variety of biotopes additional to the rocky forest where it was mainly found, being recorded in highlands, wastelands, fields with a small amount of associated woodland and large forests with deciduous woodland (42). Some of this could be attributed to the increasing frequency of hybrids with feral domestic cats (42). Parent, however, reported that in Belgium Wild Cats appeared to require large areas of continuous forest cover and would not survive in small isolated woods (3). Ragni observed that the Sardinian Wild Cat occupied a much wider variety of habitats than the mainland subspecies, being also found, for example, in grassland with a few scattered trees, in 'garigue' and marshes (46).

POPULATION

EEC: Appears to be increasing in both numbers and range in Belgium, the Federal Republic of Germany, the United Kingdom and parts of France.

Belgium: No recent estimates but Parent's study has indicated marked increases in population and range since 1950 (see above); in 1974 he estimated a density of perhaps one animal per 375 ha in the Chiers Valley in southern Belgium (3). In 1980 two authorities considered it 'Rare' (27,28), and another 'Vulnerable' (26).

France: Numbers unknown. In 1980 Saint Girons reported it to be threatened but unknown to what extent; it was however surviving well in eastern France (29) and in 1980 was reported to be increasing there (30). In Alsace the density of Wild Cats is reported to be about one per 600 ha (29), although higher densities are thought possible (38).

Italy: Ragni in 1980 estimated numbers on the mainland and on Sicily to be around 500 with about 100 on Sardinia; he considered the population to be probably decreasing (46). Most authorities agreed that it was threatened (19,31,32); Contoli commented that it was very rare and 'Endangered' on the Italian mainland and Sicily, whereas it was 'Vulnerable' in Sardinia where only local declines were evident (19).

Federal Republic of Germany: Rõben in 1980 estimated there to be perhaps 'well over 2000' and possibly slightly increasing (45); this compared to over 800 estimated in 1965 (43). An unknown number of these were hybrids. The populations in Eifel, Hunsrück and the Harz were reported significantly increasing in the early 1970s, with those in the Pfälzer Wald region in Rheinland-Pfalz and in the Taunus also increasing (9). Vogt in 1980 considered that the population in Rheinland-Pfalz was probably stable (21). The population in the Bavarian-Bohemian Forests was reported small but stable in 1980 (42). It is listed in the German Red Data Book as threatened (33).

Luxembourg: Total numbers unknown but in 1980 the Administration des Eaux et Forêts considered it 'Vulnerable' (34).

United Kingdom: No estimates in 1980, but believed to be increasing. It appears to have come from the brink of extinction in pre-war years (1914-18) to be now widely distributed over much hill ground, usually in low numbers (7,35). Possible reasons for the increase are: an increase in the amount of available habitat resulting from large-scale forestation schemes; a decrease in hunting pressure; a possible increase in prey availability (myxomatosis may have helped by providing more catchable prey during the difficult winter months) (6,7,25). However part of the apparent increase may reflect hybridization with domestic cats (see below) (7,25).

Greece: No estimates located though Ondrias in 1982 noted that the species became increasingly rare to the south (56). Antipas considered it 'Endangered' in 1982 (57).

World: Unknown but unlikely to be threatened.

THREATS

Although hunting and habitat destruction have been identified as the

main causes of the species' decline this century, hybridization with feral domestic cats has been stated by several authorities to be the principal long term threat (9,25,36,40,42,45,52). The extent of this hybridization is, however, a matter of considerable controversy; some workers have considered it to be almost universal - Suminski in a 1962 study of colouration and cranial characters in European Wild Cats maintains that he had a negligible number of pure Felis sylvestris in his sample (40), while Parent, referring to the Belgium population stressed their phenotypic homogeneity and considered that hybrids constituted only some 2% of the total population (53); he noted that hybridization apparently increased in low density populations (53). Röben thought that over half the German population could possibly be hybrids though stressed that this was largely speculation (45). Vogt has pointed out that relatively few specimens with hybrid characteristics are recorded, but this is likely to be because such specimens are rarely preserved by hunters and foresters who are the principal sources of information on Wild Cats (21). Hunting has been specifically implicated in declines in Italy, Germany, Greece and the United Kingdom (9,25,46,47,56). In Italy there was in particular a systematic campaign against harmful animals which at the time of the Cagnolaro et al inquiry in the early 1970s was still being conducted in many areas, often using such unselective methods as poisoned bait (18). Ragni in 1980 noted that the number killed each year was probably decreasing, and then amounted to around 70 individuals on the mainland and Sicily and about 15 on Sardinia (46). In Germany, heavy hunting pressure was reportedly the main cause of decline between 1848 and 1936 (9); since then this threat has apparently largely abated though Röben in 1980 stated that incidental or deliberate predator control could cause marked local declines (45). In the United Kingdom, before the recent increase, its disappearance from many areas was caused by deforestation and hunting (6,25). It is still considered vermin, particularly on grouse moors, an appreciable number being killed each year during fox control campaigns, although far fewer are killed at present (about 200 a year) than during the last century (6,25). Corbett believes the greatest long term threat is hybridization with domestic cats (see above) (25). Many are reportedly also killed incidentally in rabbit snares (47). In Belgium and France the species has apparently been mainly affected by habitat loss (16,27,29); in Belgium hunting has also been implicated but it regarded as of much less importance (16,27).

CONSERVATION MEASURES

Although Wild Cats appear to be expanding their range in many areas, part of this increase seems ascribable to hybridization with feral domestic cats, although as noted above, the importance of this phenomenon is conjectural. Studies are needed and, if possible, measures should be taken to allow the maintenance of genetically 'pure' populations of Felis sylvestris.

Belgium: Included in the hunting laws and each year the closed season is reviewed. At present, and for the last few years, the closed season has been effective throughout the year (27) although enforcement is said to be virtually nonexistent; moreover, the Ministry of Agriculture can order the destruction of the species where it sees fit to control Rabies (48). The Wild Cat has been studied by Parent, who recommended total protection of the species and the conservation of its habitat (53). In 1976 he listed two 'Parcs Naturels' (Lesse-et-Lomme and Boham-Membre) and five 'Réserves Naturelles' (Raymond Mayné, Vague

des Gomkets, Roch à l'Appel, Abbé Charles Dubois, Bois du Pays) in the 'Ardenne-et-Gaume' region in which the Wild Cat had been recently observed or was thought very likely to occur (11). A national campaign for the protection of wild small carnivores has been launched by the association 'Jeunes et Nature', and, in the Flemish region, by De Wielewaalsongeren (2[illegible] which has disseminated large amounts of educational material, including posters, leaflets and stickers (48).

France: Classified as a protected species throughout France, (Law 76-629 of 10 July 1976); does not normally occur in any French National Parks, though is present in the Parcs Naturels Régionaux of North Vosges and Lorraine (38). The species was being studied in 1980 by M. Artois of the Centre National d'Etudes Sur la Rage in Malzéville (38).

Italy: Protected under the national game laws (Law No. 968 of December 1977) (46). However Ragni has pointed out that the law is rarely observed and protection is thus largely nominal (46). No protected areas had, as of 1980, been created specifically to protect the Wild Cat though it and its habitat were protected in some national parks (e.g. Abruzzo (18)) and other protected areas (46). Ragni is the only Italian zoologist currently (1982) studying the species and has made several suggestions for its conservation in Italy, including: increased fire-protection of woodlands; sharp controls on road expansion, especially in wooded and mountainous areas; eradication of feral cats and dogs; creation of protected areas in suitable habitat, preferably occupied by isolated or genetically 'pure' populations; increased enforcement of game laws; forestry management which takes into account the needs of wildlife; long-term ecological studies of the species in important areas such as Sicily, Sardinia, the Alps and in isolated populations (e.g. in Gargano) (46).

Federal Republic of Germany: Protected by the Federal Hunting Law since 1934 and has a closed season all year round; exceptions can be permitted by the federal states in the event of 'disturbance of the biological balance', serious damage to agriculture, or for scientific purposes (9). No reserves are especially designated for the Wild Cat, although some individuals do occur in 'Naturparks' which are large areas preserved as recreational areas because of their scenic beauty (21). The species has been the subject of several studies (21,42,).

Luxembourg: Fully protected since 1972 (34).

United Kingdom: The Wild Cat is not a fully protected species, though is included in Schedule 6 of Part 1 of the 1981 Wildlife and Countryside Act; it is thus illegal to deliberately trap, net, snare or poison it or use automatic or semi-automatic weapons or artificial light for hunting it (41). The Wild Cat was the subject of a study by Laurie Corbett from 1975 to 1978, whose aims were to compare feeding ecology and social organization in Wild Cats and domestic cats, and to assess the influence of prey, weather and habitat on cat hunting strategies (7,25,37).

Greece: Does not appear to be legally protected (58). The Cretan Wild Cat (ascribed to a separate subspecies, Felis sylvestris cretensis) is reported to occur in the 4850 ha Gorge of Samania/Lefka Ori-Kreta National Park (59).

The Wild Cat is listed in Appendix 3 of the 1979 Convention on the

Conservation of European Wildlife and Natural Habitats, it is therefore to be protected, although exploitation is possible if the population level permits.

The species is also listed in Appendix 2 of the 1973 Convention on International Trade in Endangered Species of Wild Fauna and Flora, trade in it or its products between acceding nations being subject to regulation and monitoring.

REMARKS

In the past, many authors considered the Wild Cat of Eurasia, *F. silvestris*, to be a species distinct from the Wild Cat of Africa, *F. libyca* (2,8). The Wild Cat on Sardinia was usually included in *libyca*, as the subspecies *F. l. sarda*. This text follows Haltenorth (1953) and Corbet (1978) in considering *libyca* conspecific with *silvestris*, the Sardinian form being included in *Felis silvestris libyca* (2,39).

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ARTIODACTYLA: BOVIDAE	Status:	EEC	World
Capra aegagrus (Erxleben, 1777)		V/K	K

E. Wild Goat
F. Chèvre Véritable
G. Wild Goat

DISTRIBUTION

EEC: Italy (the island of Montecristo) and Greece (some of the Aegean islands and Crete) (2,7,8,9,10). However these populations are thought to have bred with domestic goats (2,7), thus whether any true Wild Goats still exist is questionable.

Italy: Confined to the island of Montecristo (2,7); where even if the population is not of domestic origin (which it may be), interbreeding with domestic goats has almost certainly occurred (7).

Greece: Occurs on some of the Aegean islands and on western Crete, also introduced to Theodorou, Agii Pantes and Dias off Crete (2,3,5,10).

World: Mountains from Asia Minor and Caucasus to Kopet Dag, W. Afghanistan, Baluchistan and Sind. Isolates in Oman. Probably also occurred formerly in N. Syria, Lebanon and perhaps south in Palestine (1).

HABITAT

Maquis in arid, inaccessible and preferably rocky regions (2,7).

POPULATION

EEC: Very unlikely to exceed 1500 animals.

Italy: In 1981 300-350 Goats were estimated to live on Montecristo; numbers were reported to be increasing (7).

Greece: Crete and the surrounding islands are believed to harbour fewer than 1000 Wild Goats (2). In 1980 Antipas reported that conservation measures enacted for the species had resulted in 'good and healthy' populations (11).

World: Unknown.

THREATS

Poaching and hybridization with domestic goats (2,7).

CONSERVATION MEASURES

Italy: Protected by law (2). Montecristo became a nature reserve in 1971 (7). Cagnolaro et al (1981) have suggested that to conserve the species on the island measures must be taken to completely eliminate poaching and to selectively cull the population in times of excess animals (7).

Greece: Protected by law. Crete has a reserve of 4850 ha - the Gorge of Samaria/Lefka Ori-Kreta National Park - in which the animal occurs (6). The island of Erimomilos is also reported to be a reserve (2). Goats

have been introduced to islands off Crete and these essentially serve as protected areas. A study was conducted on Theodorou in 1973 by N. Papageorgiou; he suggested various measures to improve the chances for the long-term survival of the Goat on the island.

REMARKS

Taxonomy within the Caprinae is very complex, especially with regard to the relationships between domestic, feral and 'wild' populations (1).

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